CALIFORNIA. DEPT. OF WATER RESOURCES
BULLETIN.

State of California

THE RESOURCES AGENCY

Department of Water Resources

BULLETIN No. 117-6

OROVILLE RESERVOIR
THERMALITO FOREBAY
THERMALITO AFTERBAY

Water Resources Recreation Report

DECEMBER 1966

HUGO FISHER
Administrator
The Resources Agency

EDMUND G. BROWN
Governor
State of California

WILLIAM E. WARNE
Director
Department of Water Resources

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FOREWORD

The purpose of this report is to present a recreation development plan for Oroville reservoir and the offstream Thermalito features. Supporting information is presented relating to visitor use predictions, the number and cost of the facilities necessary to support such use, and the estimated primary recreation benefits which will accrue as the result of the development.

The development plan was formulated by the Department of Parks and Recreation for the Department of Water Resources in conformity with Interdepartmental Agreement No. 254287, which enables the Department of Water Resources to fulfill its recreation planning responsibilities by using the professional services of the Department of Parks and Recreation.

Oroville reservoir was first authorized by the Legislature in 1951 as part of the Feather River Project (now known as the "Feather River Facilities") under Chapter 1441, Section 12260 of the Water Code. The State Water Code Sections 345, 346, and 11900 through 11925, specify that the Department of Water Resources shall plan for recreation developments associated with state-construction water projects and shall acquire sufficient land to implement the development of recreation facilities. It further specifies that the Department of Parks and Recreation shall design, construct, operate, and maintain these facilities. This report has been reviewed by interested outside agencies and their comments are attached as an appendix as required by Water Code Section 345.1.

A recreation development plan for the Oroville borrow area is presently being formulated. This report, as well as a report on the Oroville visitor facilities at Kelly Ridge, will be published at a later date.

Management of fish and wildlife resources at state water projects is the responsibility of the Department of Fish and Game, who has worked with the Department of Water Resources in the preparation of this report.

All revisions and modifications made during the review of this report has been coordinated with the Department of Parks and Recreation.

William E. Warne, Director
Department of Water Resources
The Resources Agency
State of California
December 22, 1966

State of California
The Resources Agency
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ABSTRACT

Oroville Dam, now being constructed on the Feather River about five miles northeast of the City of Oroville, will be the highest earthfill dam in the world when completed in 1968. The primary functions of Oroville Dam will be flood control, power generation, storage of irrigation and municipal water, and recreation. Oroville Reservoir, Thermalito Forebay, and Thermalito Afterbay will help meet the demand for water-oriented recreation. / On the basis of the projected use and space requirements, it has been determined that a total of about 4,545 acres of land will be needed for recreation developments. In addition to the 1,720 acres of land located in control strips around the maximum pools of Oroville Reservoir, Thermalito Forebay, and Thermalito Afterbay, 2,825 additional acres are to be purchased solely for recreational purposes. / Without the project, it is estimated that recreation use of the area in 1968 would be 62,000 visitor-days. With the project and the construction of the proposed recreation facilities predictions soar to 754,000 visitor-days in 1968. By 2017, the end of the project repayment period, over 6,000,000 visitor-days per year are anticipated. / Ten separate areas will be developed adjacent to Oroville Reservoir to provide for the picnicking, camping, and boating use expected in the next 50 years. In addition, day use areas will be developed adjacent to Thermalito Forebay and Afterbay, and in the borrow area. Vegetation will be retained in 18 coves at Oroville Reservoir to improve the fish habitat. / The initial recreation development proposed in this report will accommodate visitor-days of use expected during the first decade. The initial onshore recreation facilities to accommodate this anticipated visitation are estimated to cost approximately $9,595,000. An additional $45,000 will be required to develop the fishery in Oroville Reservoir. / The Department of Parks and Recreation will be the agency responsible to design, construct, operate, and maintain the recreation facilities. The Department of Fish and Game will be responsible for the management of the fish and wildlife resources at the project. / The management of project lands and water surfaces for recreational use will be subject to approval by the Department of Water Resources to ensure that the orderly operation of the State Water Project for its other authorized purposes is not impaired. Recreation facilities are to be available for public use when the project is completed.

As California's population zooms upward -- 1,600 per day, 600,000 per year -- the immediate need to augment existing recreation facilities has never been more plainly evident than by today's increasing, elbow-to-elbow conditions in our park and recreation areas. Hordes of people have descended upon the forests, mountains, lakes, rivers, and seashore in such numbers that existing recreation facilities are being taxed to the utmost and, in most cases, are inadequate to meet the demands imposed upon them. This is glaringly evident in the crowded parking lots, queues of automobiles awaiting campsites at many of our parks and campgrounds, busy boat-launching ramps, and throngs of people on the public beaches. Recreational use of many areas has increased to a point where the natural attractiveness is deteriorating from unwise and unguided use. Such over-use is conspicuously evident in the unauthorized but countenanced establishment of makeshift campsites within established campgrounds and in the surrounding buffer areas, resulting in trampled vegetation, dusty conditions, poor sanitary situations, and an overtaxed water supply.

Public agencies have expanded outdoor recreation facilities as rapidly as possible, while private enterprise also has increased its tempo of recreation development. Yet, in spite of these combined efforts, the outdoor recreation demand is still outpacing the supply of facilities.

The State Water Project will create a tremendous recreation potential, the development of which will be capable of alleviating a significant portion of the deficiency.

Conclusions

As a result of the studies made by the Department of Water Resources, Department of Parks and Recreation, and the Department of Fish and Game, it is concluded that:

1. The Oroville complex has high recreation potential and will receive heavy use.

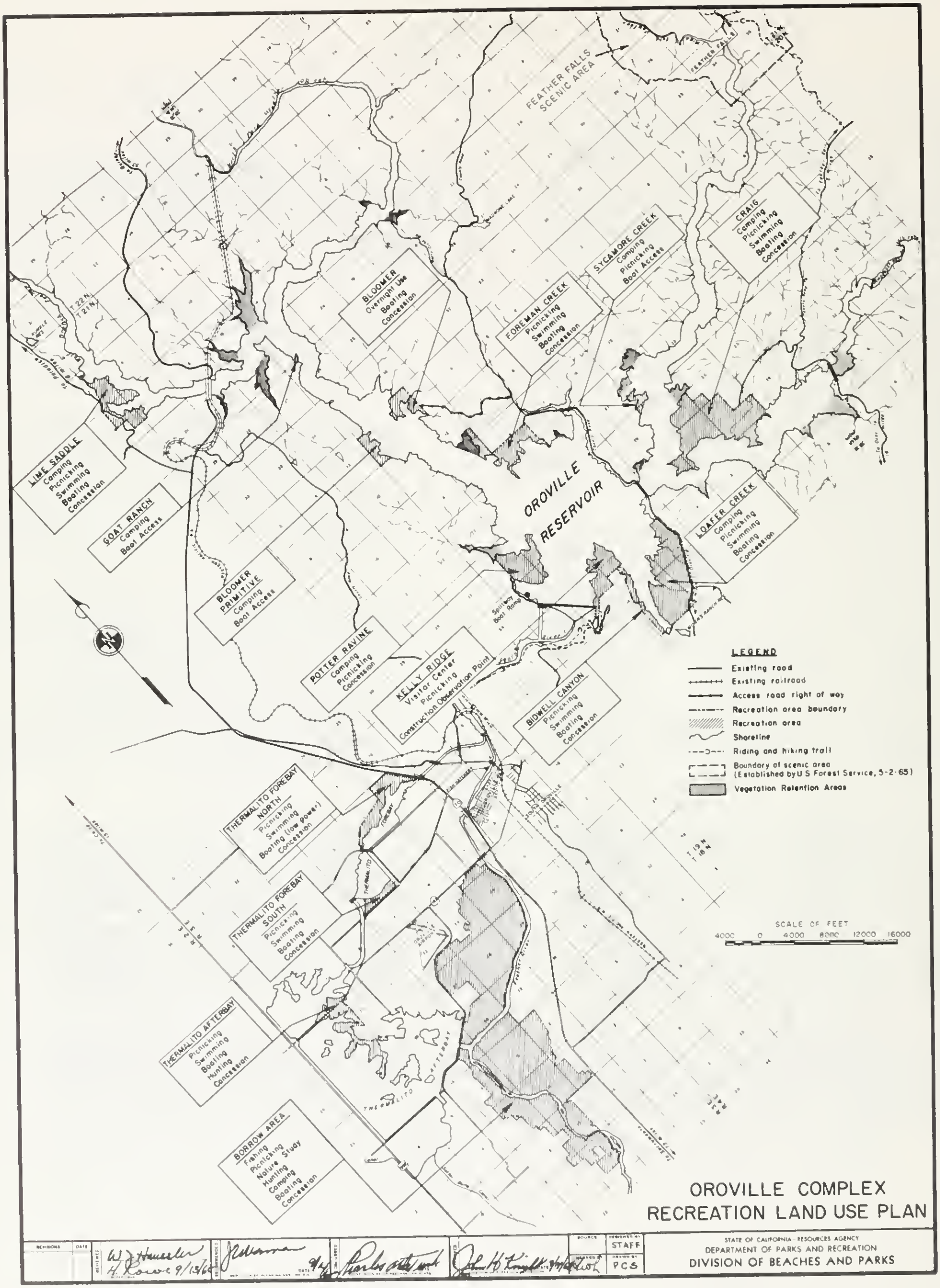
2. The development of Oroville reservoir, Thermalito Forebay, and Thermalito Afterbay for recreation use as proposed herein will contribute significantly toward meeting the statewide outdoor recreation demand.

3. The initial recreation development recommended in this plan is adequate to provide for the recreation use anticipated during the first decade of project operation. Thereafter, additional facilities are planned to be constructed in stages to satisfy continued increases in recreation demands.

Recommendations

It is recommended that the Department of Parks and Recreation and the Department of Fish and Game take the necessary action to request the appropriation of funds for the recreation and fish and wildlife developments according to the terms of the Davis-Dolwig Act.

It is also recommended that based upon information presented in this report, detailed plans be developed for the initial recreation facilities.


FEATHER FALLS SCENIC AREA
BLOOMER
Overnight Use
Boating
Concession
FOREMAN CREEK
Picnicking
Swimming
Boating
Concession
SYCAMORE CREEK
Camping
Picnicking
Boat Access
CRAIG
Camping
Picnicking
Swimming
Boating
Concession
LIME SADDLE
Camping
Picnicking
Swimming
Boating
Concession
GOAT RANCH
Camping
Boat Access
OROVILLE RESERVOIR
LOAFER CREEK
Camping
Picnicking
Swimming
Boating
Concession
BLOOMER PRIMITIVE
Camping
Boat Access
POTTER RAVINE
Camping
Picnicking
Concession
KELLY RIDGE
Visitor Center
Picnicking
Construction Observation Point
Spillway Boat Ramp
BIDWELL CANYON
Picnicking
Swimming
Boating
Concession
LEGEND
Existing road
Existing railroad
Access road right of way
Recreation area boundary
Recreation area
Shoreline
Riding and hiking trail
Boundary of scenic area (Established by U.S. Forest Service, 5-2-65)
Vegetation Retention Areas
THERMALITO FOREBAY NORTH
Picnicking
Swimming
Boating (low power)
Concession
THERMALITO FOREBAY SOUTH
Picnicking
Swimming
Boating
Concession
SCALE OF FEET
4000 0 4000 8000 12000 16000
THERMALITO AFTERBAY
Picnicking
Swimming
Boating
Hunting
Concession
THERMALITO AFTERBAY
BORROW AREA
Fishing
Picnicking
Nature Study
Hunting
Camping
Boating
Concession
OROVILLE COMPLEX
RECREATION LAND USE PLAN
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DESCRIPTION OF PROJECT AREA

This section presents discussions of the natural and physical features in the project area which have a direct effect on the type and magnitude of recreation use which will occur.

Location

Oroville reservoir and the Thermalito offstream storage features are located in Butte County near the town of Oroville on the eastern side of the Sacramento Valley. (See Vicinity Map, Plate 1.)

The reservoir is on the Feather River in the first low foothills adjacent to the valley floor. The Thermalito features, somewhat removed from the Feather River are at the valley's edge.

The largest feature of this project is Oroville Dam, about 5.5 miles upstream on the Feather River northeast of the City of Oroville. The reservoir's drainage area comprises 3,611 square miles north and east of the dam, extending to the top of the Sierra Nevada in Lassen, Plumas, and Sierra Counties.

Access

Oroville reservoir is readily accessible from the present network of roads. (See Vicinity Map, Plate 1.) U. S. Highway 99E is adjacent to the western levee of the Thermalito Afterbay, with easy turnoff access via California State Highway 162 (Merced Avenue) to the several offstream water bodies. California State Highway 70, which traverses the famed Feather River Canyon, links U. S. Highway 395 on the eastern side of the Sierra Nevada to U. S. Highway 99E and transcontinental U. S. Interstate 80 (old U. S. Highway 40) in the Sacramento Valley. California State Highway 70 also skirts Thermalito Forebay, provides a turnoff to the Lime Saddle area, and crosses the West Branch Feather River to continue up the Feather River Canyon.

The main line of the Western Pacific Railroad passes through the town of Oroville and crosses the West Branch of the Feather River near the Lime Saddle recreation site on a bridge common with California State Highway 70. While railroads do not play as important a role in transporting people to recreation areas as they once did, it is possible for recreationists to utilize this mode of travel to reach Oroville.

A modern airport serves Oroville and the surrounding community. With the increase in air traffic and greater use of small aircraft, this method of travel can become very popular. In the future, connecting facilities between airport and recreation sites could be provided through concession or private enterprise.

Topography and Vegetation

The topography varies greatly from the valley floor and low foothills to the steep-walled canyons extending 10 to 15 miles behind Oroville Dam. The vegetation around this reservoir is typical of the valley floor and foothills flora of the eastern side of the interior valleys.

The annual grasses which cover the ground during the winter and spring mature and dry by May or June, depending on the rainfall and the advent of the warm summer season. The perennial vegetation consists predominantly of manzanita, poison oak, buckbrush, several varieties of oak, madrone, digger pine, and yellow pine, each of which varies in density depending on its situation. The ravines and north-facing slopes tend to be rather heavily wooded, while the drier and south-facing slopes tend to be more open and grass-covered. Where the canyons extend into the interior of the watershed, the reservoir will be within the commercial timber production zone.

Climate

The climate of the reservoir site is typically Mediterranean, as is that of the Sacramento Valley. The winters are mild, though freezing temperatures are not uncommon during winter and early spring. Fogs of varying density and frequency occur during the winter.

Normally, the rainy season begins in late September and continues through late March, with rare rains in the summer. The average annual precipitation ranges between 20 and 25 inches. Thunderstorms, snowstorms, or hailstorms rarely occur. Rains may continue for several days at a time, but are usually gentle.

During the spring, and occasionally at other seasons of the year, winds of high velocity sweep over the area. The windstorms are generally of short duration, seldom causing severe damage. South winds usually bring cloudy and rainy conditions while north winds bring fair weather and cause drying. The summers are characterized by low relative humidity, high temperatures, and cloudless skies.

The Oroville complex is one of the largest features of the State Water Project. It includes Oroville Dam, reservoir, and Powerplant; Thermalito Diversion Dam and reservoir; the Fish Barrier Dam and Hatchery; and the off-stream features of the Thermalito Power Canal, Thermalito Forebay, Powerplant, and Afterbay. The locations of all of these are shown on Plate 1, and statistics are shown in Appendix A. A total of 47,049 acres of land are required for this development. This includes 5,645 acres of land purchased to secure the rock tailings from the gold dredger operations to use as fill material for Oroville Dam and for recreation and fish and wildlife enhancement.

Oroville reservoir is to be operated for flood control, power generation, conservation, recreation, and as a supply of water for irrigation and municipal uses. The off-stream features of Thermalito Forebay and Afterbay serve primarily for regulation of power generation flows and storage for pumpback power operations.

In the winter rainy season from October 15 to April 1 of each year, 375,000 to 750,000 acre-feet of space must be made available for flood control storage. The exact amount of flood control storage will be determined by the parameters of the Corps of Engineers, Flood Control Storage Reservation Diagram, dated September 1958. By April 1, the heavy rainy season and greatest flood possibilities have usually passed, thus permitting the use of the flood reservation space for storage. Reservoir operation plans anticipate the reservoir to fill by about June 15 in average years. It can also be expected that during certain dry-year periods, the reservoir may not fill during the entire year. To maximize the revenues from the project, it will be necessary to generate as much electricity as possible. To accomplish this, some of the water released to Thermalito Afterbay will be pumped back into Thermalito Forebay and thence back into Oroville reservoir by means of pump turbines during the offpeak power generation period, to be used again for power generation at more favorable revenue-producing periods.

To provide water of the proper temperature for the coldwater and warmwater fisheries and rice culture, it has been found necessary to install a water intake device which will allow water to be withdrawn from different depths, and thus satisfy the temperature requirements for that time of year.

Oroville reservoir is expected to fluctuate during the July-to-September period from the normal pool level (900 feet elevation) to the 825-foot level in good water years, and to the 775-foot level in poor water years.

In Thermalito Forebay, the water elevation is expected to remain almost constant at elevation 224 feet, with as little as 2 feet of drawdown during operational periods.

At Thermalito Afterbay, the water surface is expected to fluctuate from a low pool at approximately elevation 123.0 feet early Monday morning to a maximum between elevation 130 and 136.5 feet midnight Friday. To generate the maximum amount of power for project benefit, the operational water surface of the afterbay is to be kept as low as possible. Little or no power will be generated on Saturday and none on Sunday. Beginning with the largest pool early Saturday morning, irrigation, pump-back, and downstream requirements will rapidly empty the stored water to its lowest level by early Monday morning.

OROVILLE COMPLEX STATISTICS

I. Oroville Dam

1. General Features

Drainage area	3,611 sq. miles
Runoff, estimated full natural average annual flow (1894-1947)	4,596,000 AF
Maximum instantaneous flood peak	
1907 (estimate)	230,000 cfs
1955	203,000 cfs
1964	250,000 cfs

2. Reservoir

Normal pool elevation	900.0 ft
Reservoir area at elevation 900.0	15,500 ac
Reservoir shoreline at elevation 900.0	167 miles
Reservoir length up North Fork	20.7 miles
Reservoir length up South Fork	13.9 miles
Reservoir storage - normal pool	3,484,200 AF

3. Dam

Type	Zoned earthfill with included core and graded gravel shells
Crest elevation	922 ft
Height from streambed	770 ft
Crest width	80.0 ft
Crest length	6,800 ft

4. Spillway

Location	In saddle on right abutment

II. Thermalito Diversion Dam

Type	Concrete gravity
Crest elevation	233.0 ft
Height from streambed	133.0 ft
Storage at normal pool	13,500 AF
Reservoir area	330 ac
Reservoir shoreline at elevation 225	10 miles

III. Thermalito Canal

Capacity	17,000 cfs
Length	2.5 miles

IV. Thermalito Forebay Dam

Type	Earthfill
Crest elevation	231.0 ft
Maximum water surface elevation	226.0 ft
Reservoir shoreline at elevation 226	10 miles
Height of dam	65.0 ft
Reservoir capacity	11,400 AF
Reservoir area	600 ac

V. Thermalito Afterbay Dam

Type	Earthfill
Crest elevation	141.5 ft
Maximum water surface elevation	136.5 ft
Reservoir shoreline at elevation 134.2	26 miles
Height of dam	30 ft
Reservoir capacity at elevation 136.5	57,500 AF
Reservoir area at elevation 136.5	4,500 ac
Structures	
Western Canal outlet	1,200 cfs
Sutter-Butte Canal outlet	2,000 cfs

LAND USE AND ACQUISITION PLAN

The following sections summarize information developed in formulating the land use and acquisition plan for Oroville reservoir, the Forebay and Afterbay. This plan, published in office report form, established the location and amount of recreation lands to be purchased along with project lands.

Land Acquisition

An evaluation of the recreation potential of this project indicated that approximately 4,545 acres of land will provide the space needed for recreation developments during the 50-year analysis period of the project. Of this figure, 1,720 acres of land would have been purchased as the control strip for the project had recreation not been considered. Consequently, 2,825 acres of additional land will be purchased solely for recreation purposes. In order to provide public access to the reservoir surface and for project operation, a strip of land about 300 feet wide measured horizontally from the maximum water surface will be acquired. In addition to this control strip, the areas acquired for recreation are shown on Plate 1. The usable portion of the control strip will be utilized in conjunction with and as part of the recreation development.

Project lands, including recreation lands, are being purchased in one negotiation where possible, to keep costs at a minimum. Negotiations are also underway to purchase or obtain use permits on federal lands.

Sufficient land has been acquired surrounding Thermalito Forebay to provide for the proposed recreation development.

No additional land other than that required for other project purposes will be required at the Thermalito Afterbay because the control strip is sufficient in extent for the expected recreation needs and developments.

Land Use Plan

Recreation planning has been based on the following concepts and principles:

1. There must be public access to the water surface and adjoining land.

2. Facilities must be of a type and quantity to realize the full potential of the project.

3. The design and quality of facilities must be in keeping with other state and federal recreation developments to insure efficient and low-cost operation and maintenance.

4. Recreation use must be foreseen and planned to prevent physical damage to and general deterioration of the area resulting from excessive or unwise human use. All developments, initial and future, will be located to utilize and protect the natural features of the area.

5. The initial recreation facilities should accommodate the anticipated use for the first decade of reservoir operation. Succeeding developments will be staged in an orderly manner to provide for future use as the demand becomes evident.

6. Lands required for full recreation development should be acquired now to provide for long-range planning and optimum use.

Plate 1 shows the lands of the Oroville complex which, because of their recreation potential, have been selected for development to satisfy both initial and future recreation demands. These lands were chosen because of their moderate

slope, vegetative cover, and favorable relation to access roads and the water surface of the reservoir.

In general, lands surrounding the reservoir are well suited for immediate recreation development as well as for intensive future expansion. Section 11919 of the Water Code states that: "Public recreation facilities in connection with state water projects are recreational areas", while Section 11910.5 defines the types of recreation that may be developed at these areas, namely: camping, picnicking, fishing, hunting, water-contact sports, boating, sightseeing, and such other recreational pursuits usually associated with the out-of-doors. All of these activities will be made possible at this project. The lands surrounding the Oroville features are sufficient to accommodate all the uses enumerated above. Plate 1 shows a compatible land use plan in which the indicated areas will be used to their fullest potential.

RECREATION EVALUATION

The evaluation of a project for recreation benefits is usually made in terms of visitor-days of use converted to and expressed as a monetary value. The net number of visitor-days of use of a project is determined by deducting the number of visitor-days of use expected without the project and without additional recreation facilities, from the number of visitor-days of use anticipated with the project. The net economic worth or benefit of recreation use is derived by multiplying visitor-days of use by the assigned monetary value of a visitor-day of use.

Inasmuch as the Oroville complex will provide both day and overnight use, projections of use were made for the project on both basis.

For the Oroville complex, projections of recreation use were based on the following assumptions:

1. Participation in out-of-door recreation will increase at about the same rate for the next 50 years as it has in the past 10 years. (This will tend to give a conservative figure because historic trend has shown an increased use rate greater than the estimated rate.)

2. The population from which the use is expected to originate will increase at about the same rate as that of the State as a whole.

3. Recreation use at the Oroville complex will occur at about the same level of demand as occurs at similar recreation reservoirs in similar situations.

4. A fishery will be developed in Oroville reservoir to support the predicted angler use.

Recreation Use, Statistics, and Forecasts

The Oroville complex water storage facilities will be completed in 1968. To prepare an orderly recreation development plan which will provide the needed recreational facilities at the project requires that estimates be made of the recreation demand that will occur when the project is completed. The "Comparable Reservoir Method" was selected because of its greater applicability. This method uses experience gained at existing reservoirs for predicting what will occur at proposed reservoirs. A comparable reservoir is selected for characteristics similar to those of the one proposed. Shasta Lake, approximately 105 miles north of the Oroville reservoir, was selected as the comparable reservoir because use data were available and both reservoirs are generally similar in size, topography, and location to centers of population.

Day use, which originates primarily 10 to 75 miles distant (occasionally up to 125 miles), is expected to provide the bulk of visitation at the Oroville complex -- 5,000,000 visitor-days by 2017 -- exclusive of the visitation at the fish hatchery, borrow area, and the Oroville visitor facilities. This great amount of day use cannot be expected in the early part of the 50-year repayment period of the project, but is expected to be more evident 20 or so years hence mainly because of population increases, more leisure time, and greater mobility. Thus, the San Francisco Bay area, which is now on the periphery of the day use zone, is expected to account for a greater portion of the anticipated day use. Initial day use predictions are based on per capita use rates applied to the population surrounding the reservoir. By applying population increase factors and increased

recreation per capita use rates to initial use figures based on 10-mile zones, decadal use projections were determined. These are shown in Table 1.

Overnight use, which originates throughout the State, is expected to account for 160,000 visitor-days of use in 1968 and increase to 1,200,000 days of use by 2017.

Overnight use predictions are based on a comparison of use at Shasta Lake. Inasmuch as Oroville reservoir is 85 miles closer to the San Francisco Bay area than Shasta, it is logical to assume that Oroville should attract more visitors than Shasta Lake. Shasta Lake received 167,000 overnight days of use in 1960, 168,000 in 1962, and 236,000 in 1964. Shasta Lake's campgrounds in 1960 consisted of 340 units. The 1960 U. S. Forest Service Fourth-of-July visitor use count at Shasta Lake indicated that 800 campsites would have been required to accommodate the people who wanted to camp. Even on normal summer weekends it is probable that more than 340 camp units would have been utilized by the public if they had been available. It has been assumed that, had Oroville been built and in operation, it would have provided for and received at least as much use as Shasta Lake. Based on 100 days of use per season, 340 camp units, and an average party size of 4.2 people, this would have resulted in approximately 143,000 visitor-days of use. By applying population increase factors and per capita use factors, the visitor-days would have increased to 160,000 by 1968, and to 320,000 by 1977, the year for which initial recreation facilities are being sized.

Recreation Use Without the Project

To evaluate net use, it is necessary to ascertain the recreation use under two conditions -- with project and without project. Based on population projections and recreation per capita use increase factors, recreation use without the project and without additional facilities was calculated by decades. These values are shown in Table 1 for a 50-year project period extending from 1968 through 2017. The net recreation use is obtained by subtracting the use without the project from the use with the project.

Recreation Benefits

The recreation benefits for the Oroville complex were computed by the consumer-surplus method by the Department of Water Resources. This method considers the cost of travel, origin of trip, number of visitors, and length of stay in the recreation area. Because the origin and length of stay in the recreation area varies greatly between the day use and overnight use, two values of a visitor-day were determined. The average benefit value per visitor-day for day use was found to be $1.10, and for overnight use was $2.00. These values indicate the direct recreation benefit attributed to individuals who visit the facilities.

The total recreation benefits were determined by multiplying the values per visitor-day times the anticipated increase in recreation use data supplied by the Department of Parks and Recreation in Table 1. The estimated present worth of recreation benefits for the 50-year analysis period from 1968 to 2017 is $54,900,000 and the average annual equivalent benefit is $2,560,000.

Table 1: OROVILLE COMPLEX RECREATION USE PREDICTIONS

(In 1,000 visitor days)

Conditions	1968			1977			1987			1997			2007			2017		
	Day	Overnight	Total	Day	Overnight	Total	Day	Overnight	Total	Day	Overnight	Total	Day	Overnight	Total	Day	Overnight	Total
With Project	594	160	754	961	320	1,281	1,549	487	2,036	2,417	693	3,110	3,533	936	4,469	5,004	1,209	6,213
Without Project	47	15	62	81	24	105	132	39	171	198	62	260	287	85	372	394	117	511
Increase	547	145	692	880	296	1,176	1,417	448	1,865	2,219	631	2,850	3,246	851	4,097	4,610	1,092	5,702

To utilize the favorable environment that will be created by Oroville reservoir, recreation facilities must be provided as demands develop. Initial and future demands must be determined and a development program established to plan the necessary facilities.

Initial Recreation Development

The initial development should provide facilities for 1,281,000 visitor-days of recreation use by the end of 1977 -- 961,000 day, and 320,000 overnight visitor-days. It is the policy of the Department of Water Resources to provide facilities which will be required during this initial ten-year period. The recommended development includes 5 beaches, 595 beach parking spaces, 605 picnic units, 890 picnic parking spaces, 675 camp units (parking site included), 44 primitive camp units, 6 boat launching ramps with a total of 24 launching lanes, and 1,110 car and boat trailer parking spaces.

Oroville Dam will be completed in 1968, although storage water will begin in the fall of 1967. To assure that facilities will be available as needed, a staging schedule has been proposed which will provide for the needed initial recreation development in a logical and orderly manner at the various locations surrounding the reservoir. The schedule of initial development for each recreation area is set forth in Table 2.

Loafer Creek

The Loafer Creek recreation development site is 9 miles east of Oroville on the Oroville-Lake Madrone-Bucks Lake Road, shown on Plate 1. In addition to its ease of access, Loafer Creek lends itself extremely well to the development of facilities for camping, picnicking, swimming, beach activities, boating, and other uses associated with land-water recreation use. Because of its favorable location and terrain, Loafer Creek

Table 2: OROVILLE COMPLEX INITIAL RECREATIONAL DEVELOPMENT SCHEDULE

Budget 1/ Year	Recreation Area	Camp Units	Picnic Units	Picnic Parking	Beach Parking	Boat Launching Lanes	Car and Trailer Parking	Primitive Camp Units	Total
1965-66	Lime Saddle	75	80	120	65	4	235	-	$ 1,342,770
	Thermalito Forebay - North	-	50	75	125	-	-	-	
1966-67	Loafer Creek	300	200	300	180	4	240	-	3,762,725
1967-68	Thermalito Forebay - North	-	75	100	150	2	35	-	3,267,600
	Thermalito Forebay - South	-	50	75	75	3	140	-	
	Spillway Boat Ramp	-	-	-	-	8	310	-	
	Loafer Creek - (Service Yard and Utilities)	-	-	-	-	-	-	-	
	Thermalito Afterbay	-	-	-	-	3	150	-	
	Lime Saddle	-	-	-	-	-	-	-	
1968-69	Goat Ranch	-	-	-	-	-	-	10	625,000
	Thermalito Afterbay	-	150	220	-	-	-	-	
1969-70	Bloomer Primitive	-	-	-	-	-	-	34	77,000
1970-71	Loafer Creek	300	-	-	-	-	-	-	520,000
	TOTAL	675	605	890	595	24	1,110	44	$ 9,595,095

1/ Fiscal year in which funds will be budgeted. Construction will start late in budget year or in following fiscal year.

ENTRANCE & SERVICE AREA

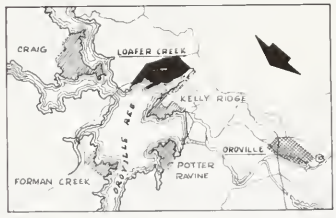
- 2 ENTRANCE STATIONS - 4 LANES EACH
- 4 RANGER RESIDENCES
- 4 TRAILER PADS
- PARK OFFICE & INFORMATION BLDG.
- SERVICE AREA

CAMP UNITS

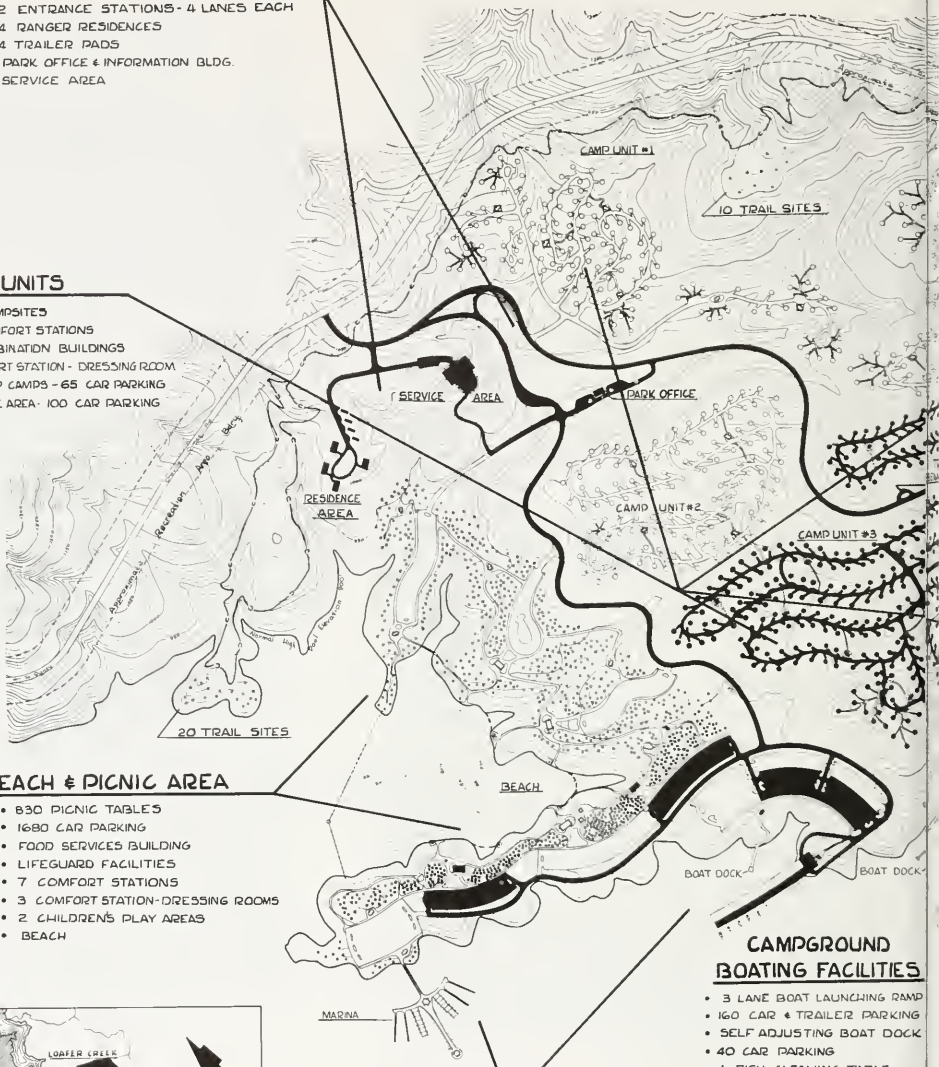
- 1231 CAMPSITES
- 22 COMFORT STATIONS
- 30 COMBINATION BUILDINGS
- 1 COMFORT STATION - DRESSING ROOM
- 4 GROUP CAMPS - 65 CAR PARKING
- DAY USE AREA - 100 CAR PARKING

BEACH & PICNIC AREA

- 830 PICNIC TABLES
- 1680 CAR PARKING
- FOOD SERVICES BUILDING
- LIFEGUARD FACILITIES
- 7 COMFORT STATIONS
- 3 COMFORT STATION - DRESSING ROOMS
- 2 CHILDREN'S PLAY AREAS
- BEACH



LOCATION MAP

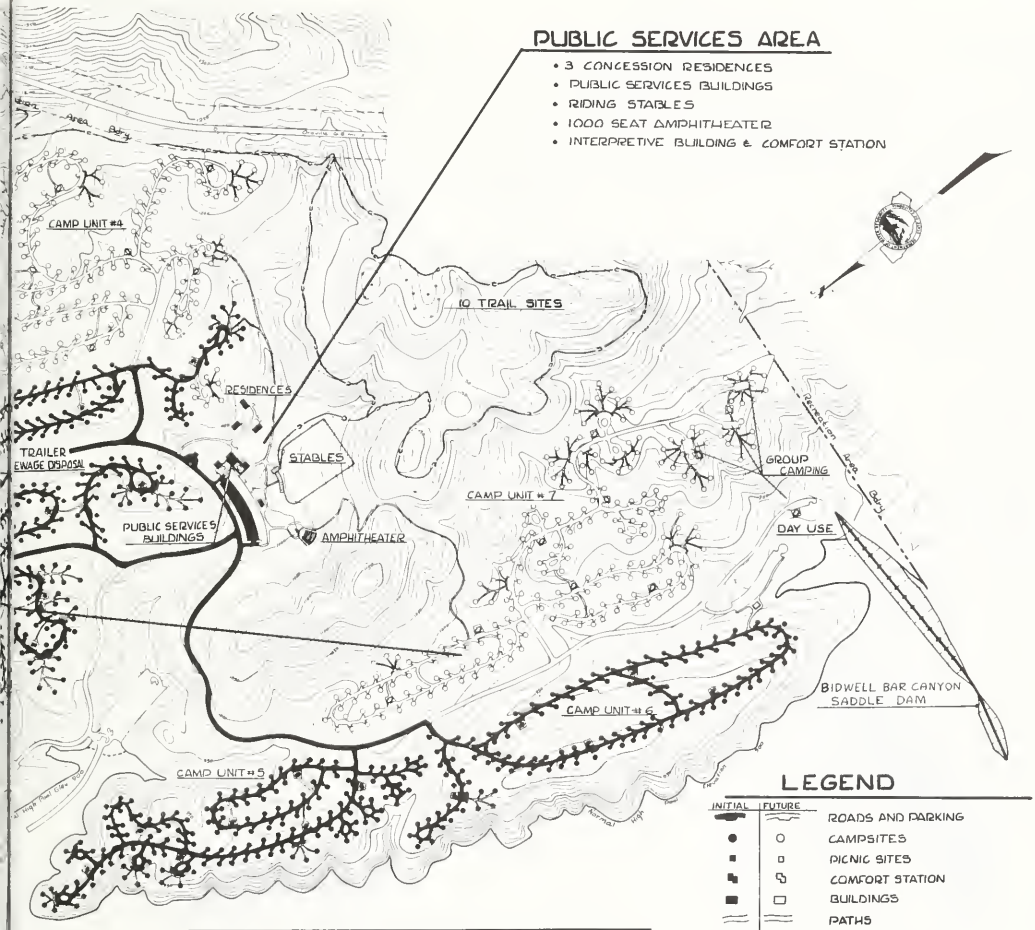


CAMPGROUND BOATING FACILITIES

- 3 LANE BOAT LAUNCHING RAMP
- 160 CAR & TRAILER PARKING
- SELF ADJUSTING BOAT DOCK
- 40 CAR PARKING
- 1 FISH CLEANING TABLE

BOATING FACILITIES

- MARINA
- 380 CAR PARKING
- 8 LANE BOAT LAUNCHING RAMP
- 480 CAR & TRAILER PARKING
- FLOATING BOAT DOCK
- 2 COMFORT STATIONS
- 2 FISH CLEANING TABLES

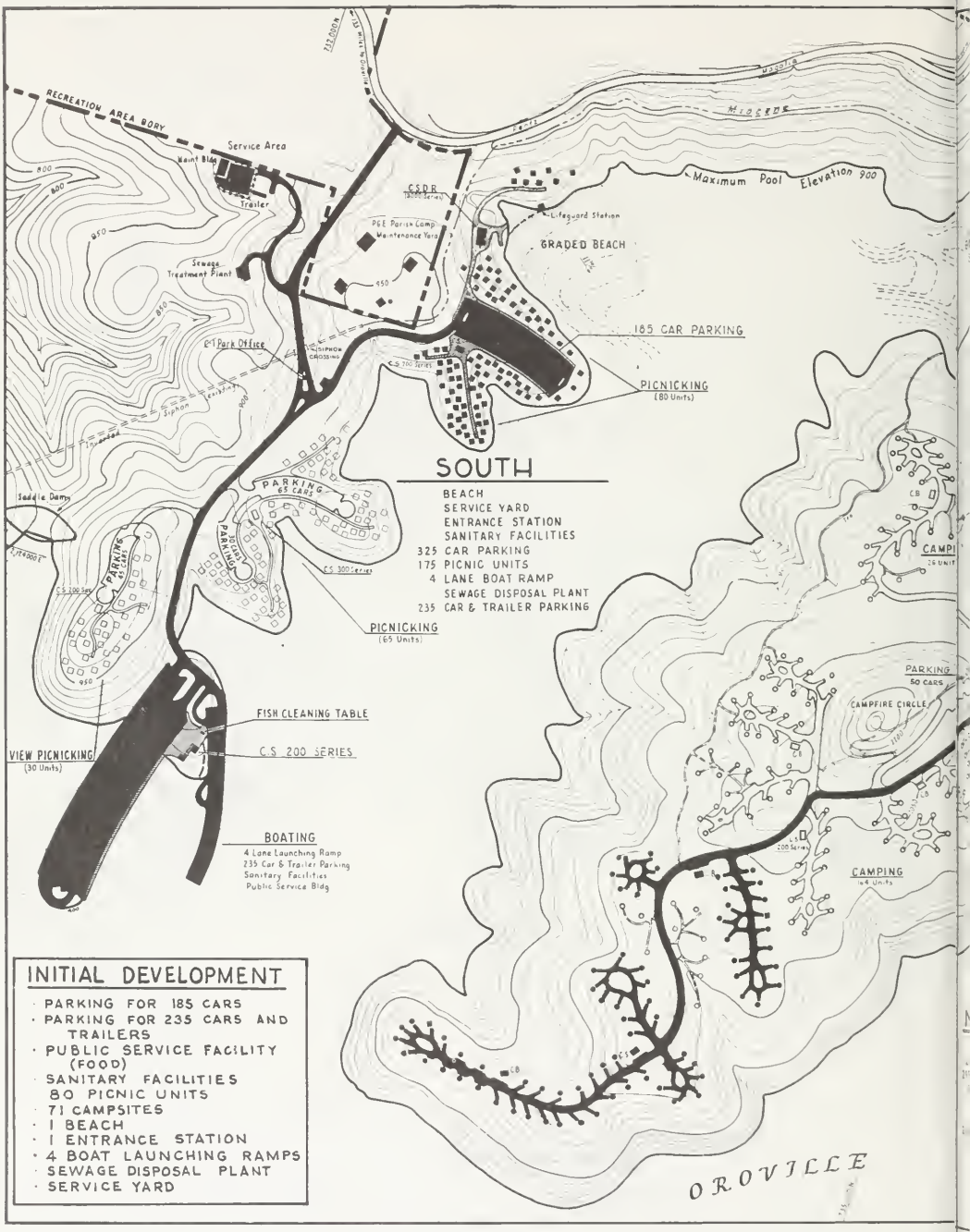


INITIAL RECREATION DEVELOPMENT

- SERVICE & ENTRANCE AREA
- BEACH & PICNIC AREA - 480 CAR PARKING
- 200 PICNIC UNITS
- BOATING FACILITIES - 4 LANES W/ 240 CAR PARKING
- 600 CAMP UNITS
- AMPHITHEATER - 100 CAR PARKING
- PUBLIC SERVICES FACILITIES

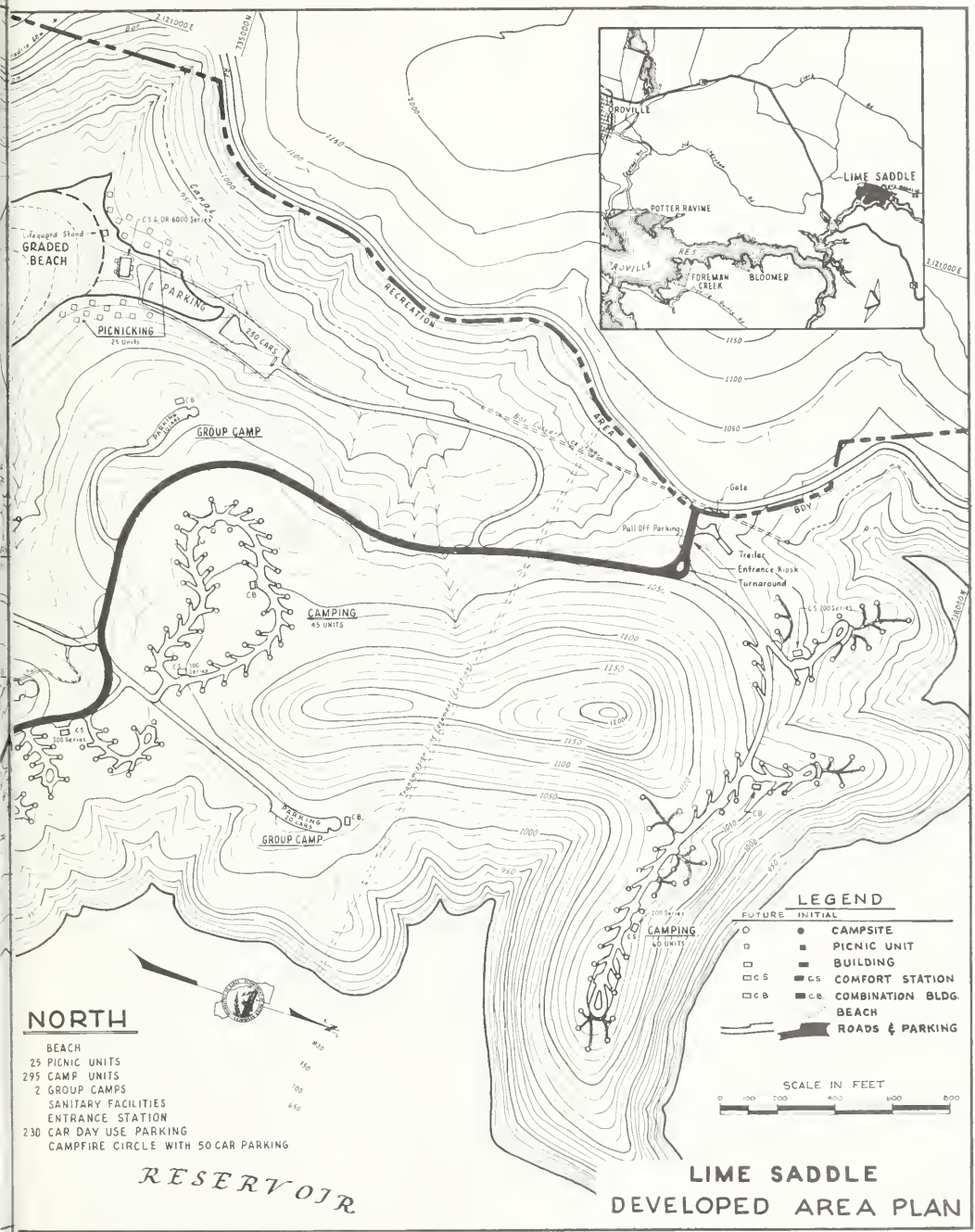
Scale of Feet

LOAFER CREEK
DEVELOPED AREA PLAN



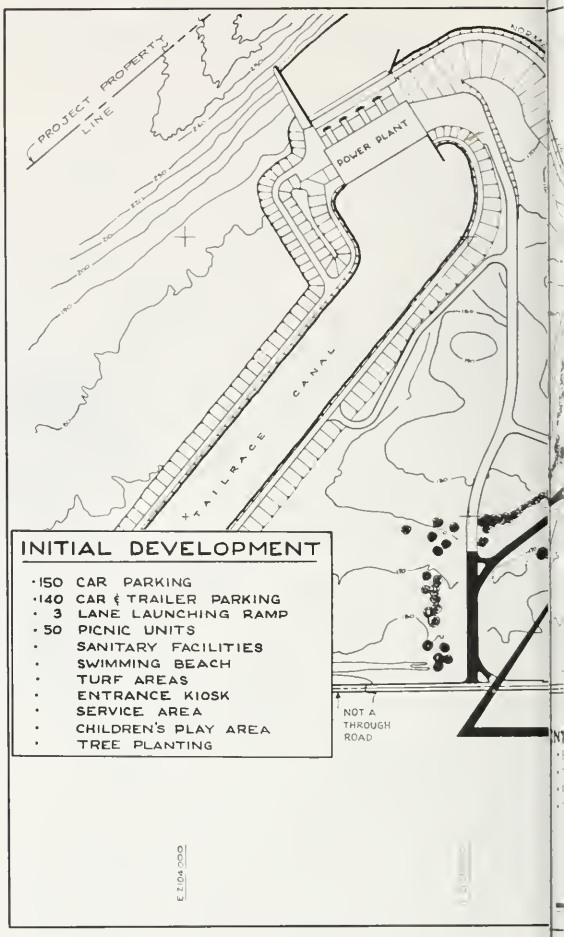
INITIAL DEVELOPMENT

- PARKING FOR 185 CARS
- PARKING FOR 235 CARS AND TRAILERS
- PUBLIC SERVICE FACILITY (FOOD)
- SANITARY FACILITIES
- 80 PICNIC UNITS
- 71 CAMPSITES
- 1 BEACH
- 1 ENTRANCE STATION
- 4 BOAT LAUNCHING RAMPS
- SEWAGE DISPOSAL PLANT
- SERVICE YARD



LIME SADDLE
DEVELOPED AREA PLAN

has been selected for intensive initial development. In view of the anticipated recreation use and the intensive nature of the initial development, the first phase was included in the budget for the 1966-67 fiscal year. This will consist of 200 picnic sites, 300 camp units, a boat-launching ramp containing 4 launching lanes, 720 parking spaces, and a developed beach area. An amphitheater with 100 parking spaces will also be included. To complete this initial phase, 300 camp units will be included in the budget for the 1970-71 fiscal year. Plate 2 shows a development scheme for initial and planned future recreation facilities. Construction is scheduled to start on the initial facilities in the spring of 1967.

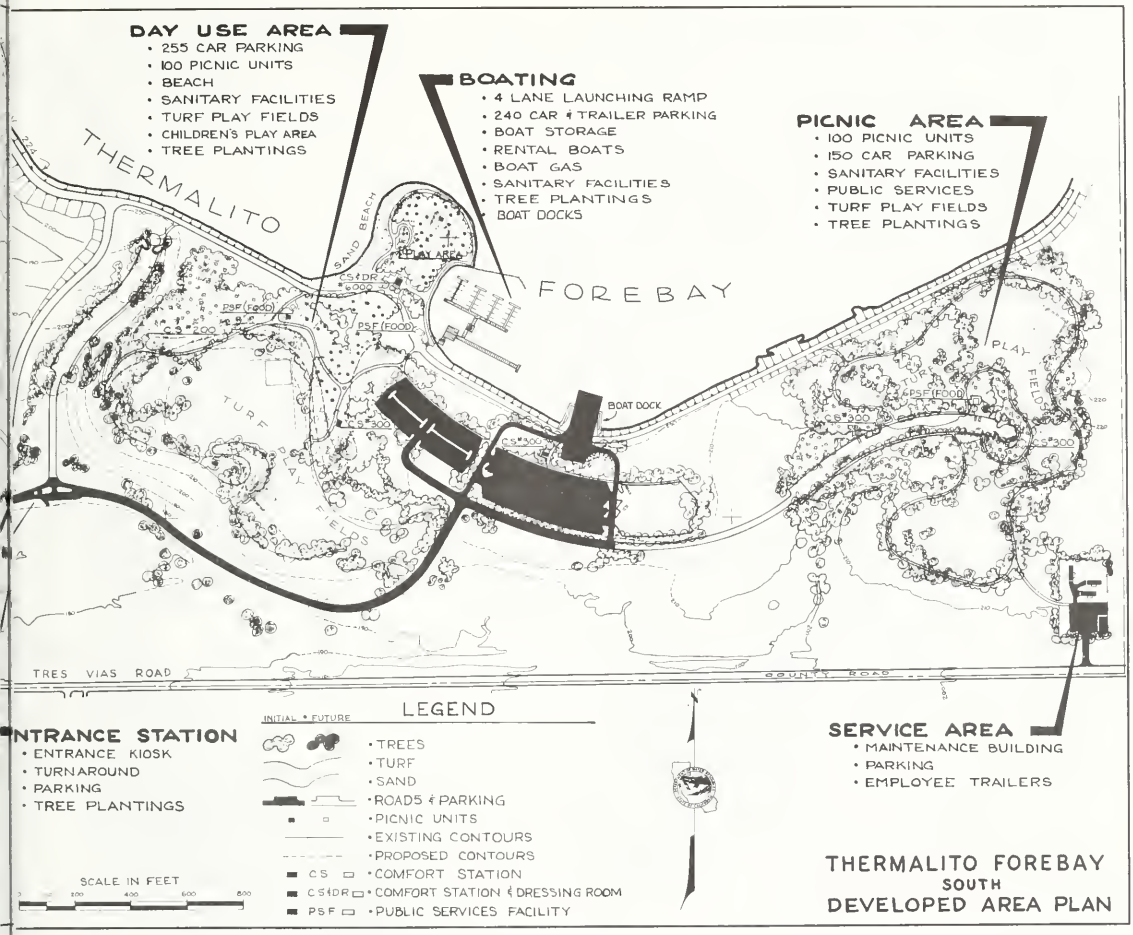


Lime Saddle

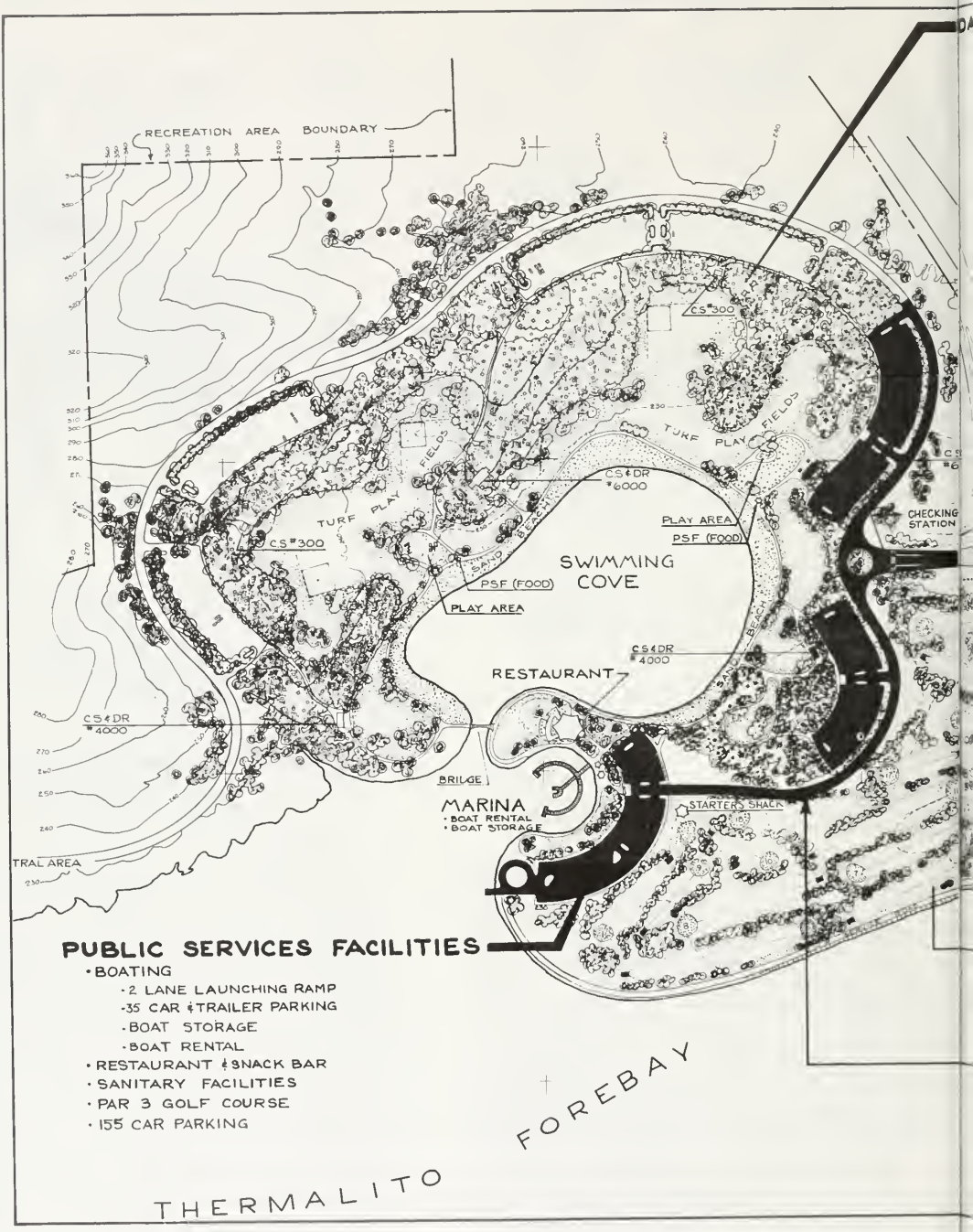
The Lime Saddle recreation development site is located on the Pentz-Magalia Road, 2 road-miles west of California State Highway 70, approximately 15 miles north of Oroville. The area is shown on Plate 1. Lime Saddle is situated on the West Branch Feather River in an oak-grassland-brush zone of moderately sloping terrain. California State Highway 70, the Feather River Highway, provides easy access to this location for travelers. Because of the anticipated use at this reservoir, it is believed wise to phase the construction of the initial development to properly accommodate the anticipated use. Here again, facilities will be provided to satisfy the need for camping, picnicking, swimming, boating, fishing, etc. The first phase of the initial development was budgeted during the 1965-66 fiscal year and will consist of 80 picnic sites, 75 camp units, a boat-launching ramp containing 4 launching lanes, 420 parking spaces, and a developed beach area. Construction of the initial facilities is scheduled to start in the fall of 1966. Plate 3 shows a development scheme for initial and planned future recreation facilities.

Thermalito Forebay

While Thermalito Forebay and Afterbay are offstream features of the Oroville complex, they are considered to be integral parts of the complex. Because these dams will be completed in December of 1967 and filled during the early part of 1968 to provide water for testing of the Thermalito power facilities, recreation facilities must be available for public use early in 1968. Thermalito Forebay will provide two recreation development locations: Thermalito Forebay North, 2 miles northwest of Oroville on California State Highway 70; and Thermalito Forebay South, 2 miles northwest of Oroville on Grand Avenue-Tres

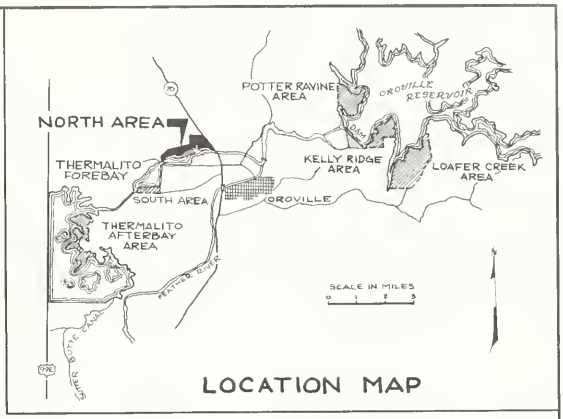


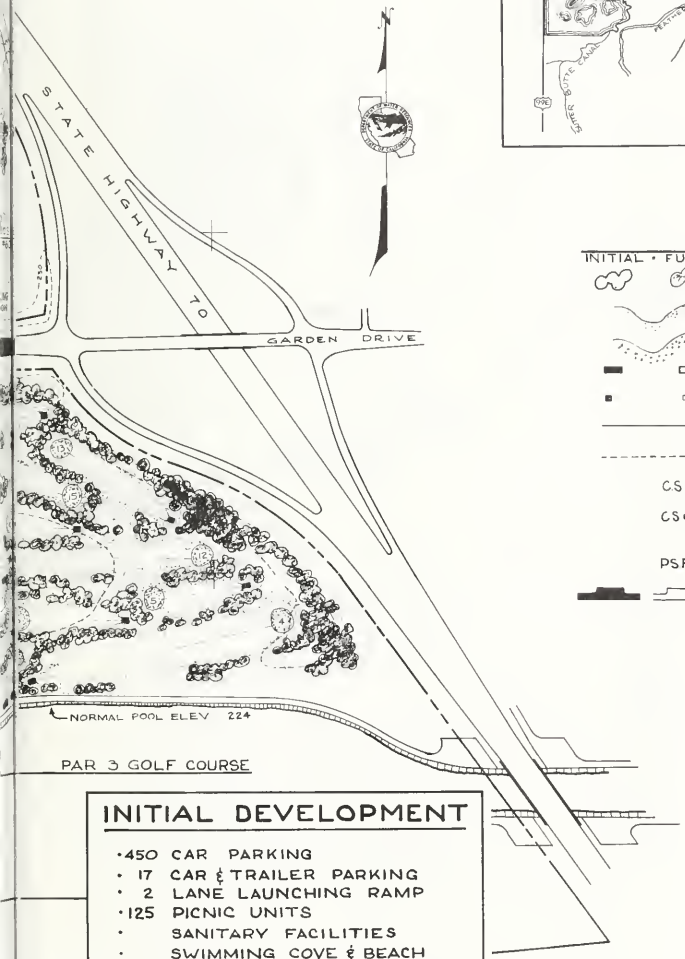
Vias Road. Day use activities are most suitable for these smaller water bodies and developments are being provided to satisfy the anticipated demand. Because various day use activities can conflict (for example, water skiing versus swimming), the reservoir surface has been divided with respect to activities by the bridge crossing on Nelson Avenue. Water skiing will be confined to the area west of the bridge, and non-power boating east of the bridge. This will provide safe and adequate space for the swimming and non-power boating activities as well as for speed boating and water skiing. It will also be necessary to stage the initial development for this site. The first phase was budgeted during the 1965-66 fiscal year and will consist of 50 picnic units, 200 parking spaces, and a beach area, all to be placed in the north location. Construction is scheduled to start on the initial facilities in the fall of 1966. The second phase to be bugeted for fiscal year 1967-68 will be to construct five boat launching ramps (two in the north area and three in the south area), and will consist of beach enlargement in the north location, a small beach in the south location, 125 picnic units (75 north and 50 south), and 575 parking spaces for picnicking, beach use, and boat ramps. Plates 4 and 5 show development schemes for initial and planned future recreational facilities.


RECREATION AREA BOUNDARY
CS #300
TURF PLAY FIELDS
CS & DR #6000
PLAY AREA
PSF (FOOD)
SWIMMING COVE
SAND BEACH
CHECKING STATION
CS #300
PSF (FOOD)
PLAY AREA
CS & DR #4000
RESTAURANT
CS & DR #4000
BRIDGE
MARINA
• BOAT RENTAL
• BOAT STORAGE
STARTER'S SHACK
TRAL AREA
PUBLIC SERVICES FACILITIES
• BOATING
- 2 LANE LAUNCHING RAMP
-35 CAR & TRAILER PARKING
- BOAT STORAGE
- BOAT RENTAL
• RESTAURANT & SNACK BAR
• SANITARY FACILITIES
• PAR 3 GOLF COURSE
• 155 CAR PARKING
FOREBAY
THERMALITO

DAY USE AREA

- 1260 CAR PARKING
- 450 PICNIC UNITS
- TURF PLAY FIELDS
- PLAY AREAS
- PUBLIC SERVICES FACILITIES (FOOD)
- BEACH
- SANITARY FACILITIES
- TREE PLANTINGS





LEGEND

INITIAL • FUTURE	
	TREES
	TURF
	SAND
	BUILDINGS
	PICNIC UNITS
	EXISTING CONTOURS
	PROPOSED CONTOURS
CS	COMFORT STATION
CS&DR	COMFORT STATION AND DRESSING ROOM
PSF	PUBLIC SERVICES FACILITY
	ROADWAY & PARKING

INITIAL DEVELOPMENT

- 450 CAR PARKING
- 17 CAR & TRAILER PARKING
- 2 LANE LAUNCHING RAMP
- 125 PICNIC UNITS
- SANITARY FACILITIES
- SWIMMING COVE & BEACH
- TURF PLAY AREAS
- CHILDREN'S PLAY AREA
- ENTRANCE KIOSK
- TREE PLANTING

SCALE IN FEET
0 100 200 400 600 800

THERMALITO FOREBAY NORTH DEVELOPED AREA PLAN

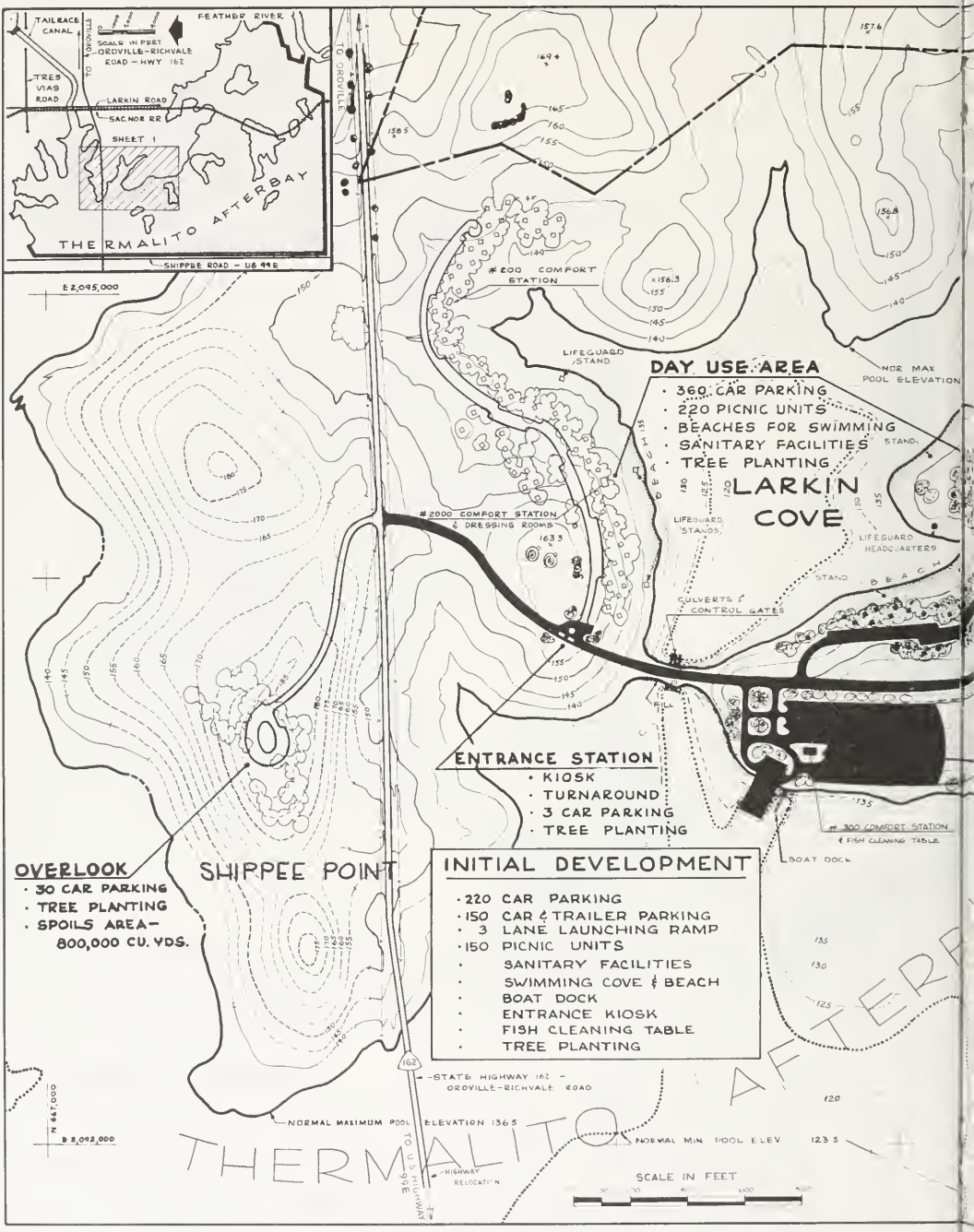
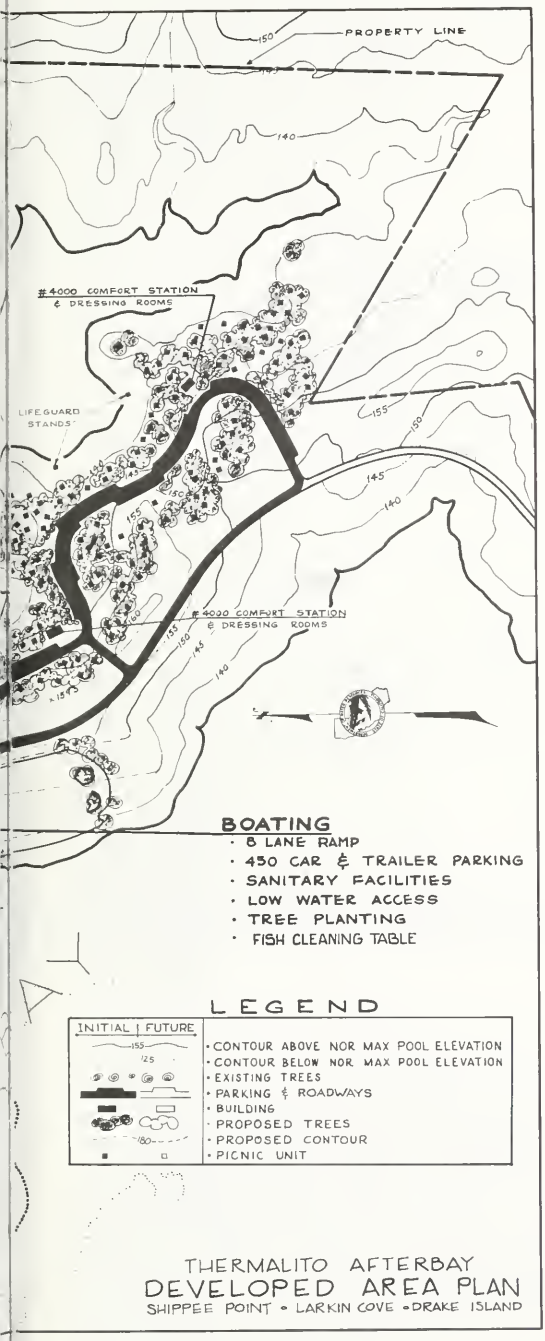

TAILRACE CANAL
FEATHER RIVER
SCALE IN FEET
OROVILLE-RICHVALE ROAD - HWY 162
TO OROVILLE
TRES VIAS ROAD
LARKIN ROAD
SAC NOR RR
SHEET 1
THERMALITO AFTERBAY
SHIPPEE ROAD - US 99E
TO OROVILLE
E 2,095,000
#600 COMFORT STATION
LIFEGUARD STAND
DAY USE AREA
· 360 CAR PARKING
· 220 PICNIC UNITS
· BEACHES FOR SWIMMING
· SANITARY FACILITIES
· TREE PLANTING
NOR MAX POOL ELEVATION
LARKIN COVE
#2000 COMFORT STATION & DRESSING ROOMS
LIFEGUARD STANDS
LIFEGUARD HEADQUARTERS
BEACH
CULVERTS & CONTROL GATES
ENTRANCE STATION
· KIOSK
· TURNAROUND
· 3 CAR PARKING
· TREE PLANTING
#300 COMFORT STATION & FISH CLEANING TABLE
BOAT DOCK
OVERLOOK
· 30 CAR PARKING
· TREE PLANTING
· SPOILS AREA - 800,000 CU. YDS.
SHIPPEE POINT
INITIAL DEVELOPMENT
· 220 CAR PARKING
· 150 CAR & TRAILER PARKING
· 3 LANE LAUNCHING RAMP
· 150 PICNIC UNITS
· SANITARY FACILITIES
· SWIMMING COVE & BEACH
· BOAT DOCK
· ENTRANCE KIOSK
· FISH CLEANING TABLE
· TREE PLANTING
STATE HIGHWAY 162 - OROVILLE-RICHVALE ROAD
NORMAL MAXIMUM POOL ELEVATION 1365
N 467,000
E 2,092,000
THERMALITO AFTERBAY
TO U.S. HIGHWAY 99E
HIGHWAY RELOCATION
NORMAL MIN POOL ELEV 1235
SCALE IN FEET

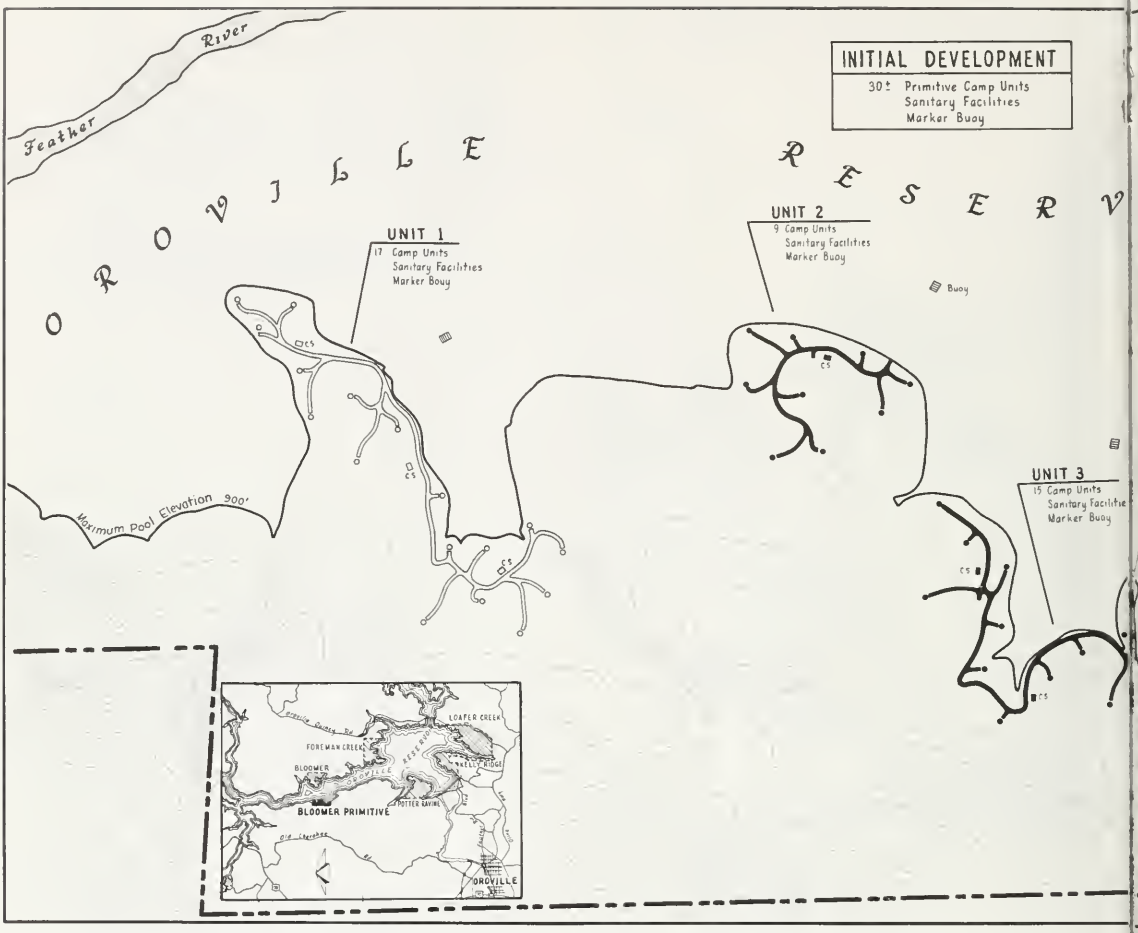
PLATE 6



Thermalito Afterbay

Thermalito Afterbay is 7 miles west of Oroville, adjacent to California State Highway 162, and 1 mile east of the junction of California State Highway 162 and U. S. Highway 99E.

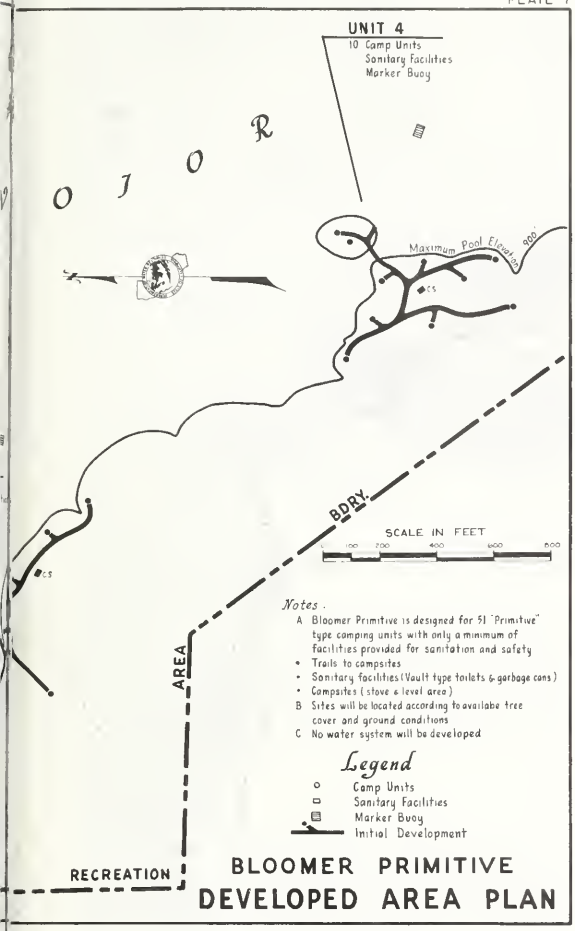
The primary function of this water body is regulation of power flows and storage for pumpback power operations. During project operation, the water surface of the Afterbay will be subject to considerable weekly fluctuation, especially during the recreation season. In later years as the demand for water increases, this fluctuation will reduce the recreational attractiveness of the area. The greatest water surface fluctuation is expected to occur on weekends during the irrigation season. Since this coincides with the most important recreation period, there will be some curtailment of recreation. This reduction in use potential has been minimized by the provision of a swimming lagoon. Thermalito Afterbay is expected to be used primarily for day use, particularly water skiing, swimming, and picnicking. Since this water body will be in existence by the spring of 1968, it will be most useful and will provide the greatest benefit early in the first decade, before Oroville reservoir goes into full power production, by providing day use facilities to an area deficient in water bodies with recreation potential. The first phase, scheduled for budgeting in fiscal year 1967-68, consists of 150 picnic sites with 220 parking spaces and 3 boat launching lanes with 150 parking spaces for cars and trailers. Plate 6 shows a development scheme for initial and planned future recreation facilities.



Bloomer Primitive

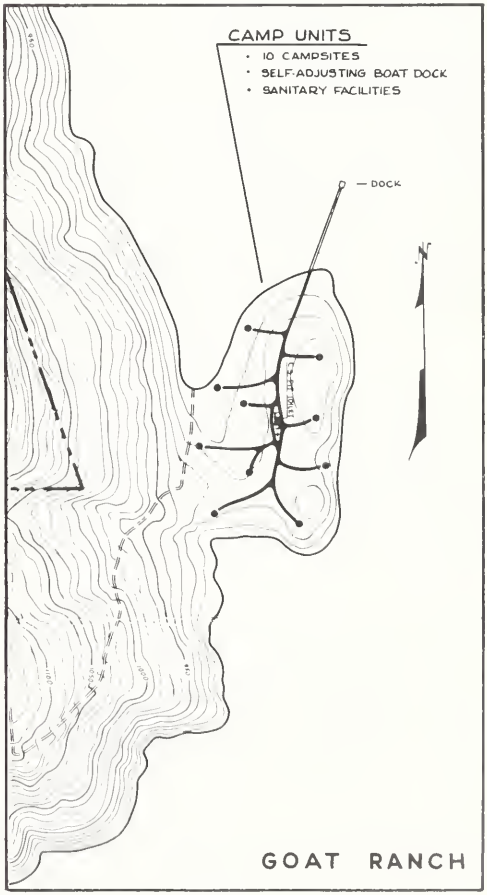
Bloomer Primitive is a boat-in primitive-style camping site 7 miles north of Oroville Dam on the west side of the North Fork Feather River. Access will be by boat only. Because of the relatively small acreage available for use, the development will be planned and used to retain its primitive characteristics. Facilities will be provided, but not as elaborate as at the usual campground. Site developments will be designated to satisfy the desire for a wilderness-type experience as well as for the boater just "poking around". A development for this site is slated for budgeting in the 1969-70 fiscal year. It will consist of 34 primitive camp units, with adequate sanitation (chemical toilets), and a potable water supply. Plate 7 shows a development scheme for initial and planned future recreation facilities.

PLATE 7



and the adventuresome individuals looking for a wilderness and an "away-from-it-all" experience. The recreation development is scheduled for budgeting in fiscal year 1968-69. It will consist of ten primitive camp units, adequate sanitation (chemical toilets), and a potable water supply. No further development is contemplated at this location during the life of the project. Plate 8 shows a development scheme for initial and planned future recreation facilities.

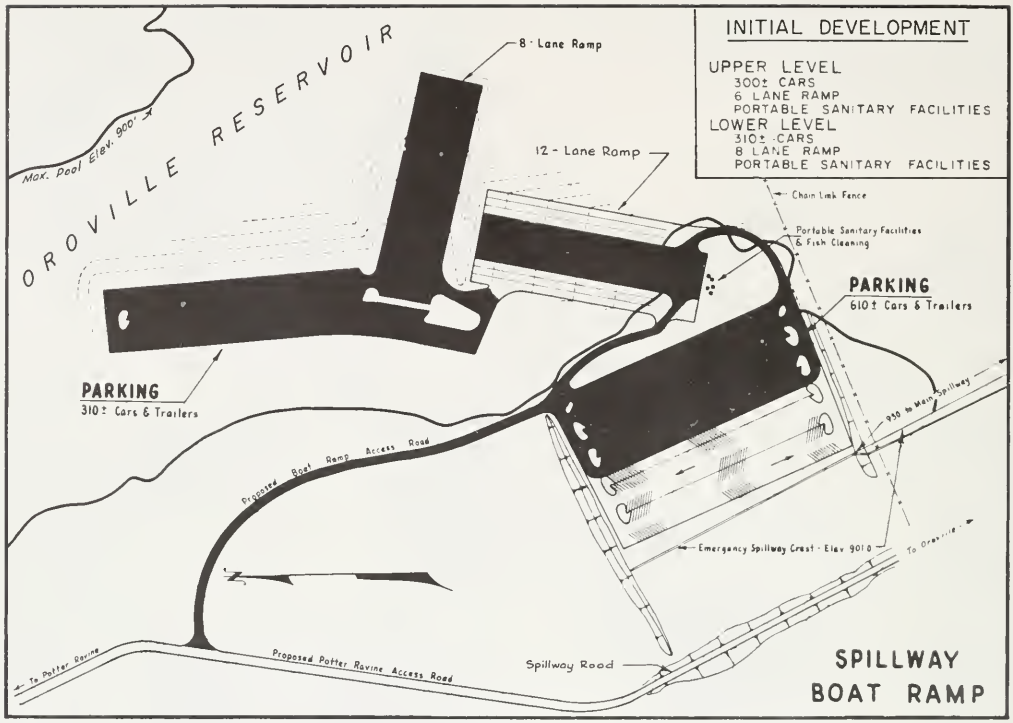
PLATE 8



Goat Ranch

Goat Ranch is another boat-in, primitive-style camping site, 10 miles north of Oroville on the westerly bank of the North Fork Feather River. As at Bloomer Primitive, access will be by boat. Because the site is small, the primitive characteristics of the location will be retained. The facilities to be provided will not be elaborate, but are designed to satisfy the desires of the boaters

PLATE 9



Spillway Area Boat Launching Ramps

The spillway boat launching site is located in and adjacent to the approach channel to the emergency spillway for Oroville Dam. Access to the launching is shown on Plate 1.

During excavation of the emergency spillway area, construction conditions were such that it was advantageous to both the dam contractor and the State to dispose, place, and utilize excavation material in such a manner whereby embankment suitable for construction of boat launching ramps could be provided at no additional cost to the State. Additional boat ramps are needed to alleviate the launching problem at this reservoir in later years because heavy boating activity is expected, and potentially good launching sites are lacking. It was to the best interests of the State to avail itself of this opportunity which became evident during the construction period.

The emergency spillway has been designed for that purpose only and will spill water only when the gates on the main spillway cannot discharge the inflow to the reservoir. Flood flows which would require the use of the emergency spillway will occur only in extremely rare instances and at such times the spillway launching facility would be closed to public use.

This launching site is subject to certain project operation conditions. Flood control reservations require storage space in the reservoir from October

through March. In wet years and due to operating procedures, the reservoir may be full (900-foot elevation) until late in June. Thus, during this period, it is quite possible that the ramps would be closed to public use or would be inaccessible due to the high reservoir stage. Boating use during this period can be accommodated at other launching sites. The spillway site will be available during the main, heavy recreation use season through the summer months.

The development is scheduled for budgeting in fiscal year 1967-68. The recreational development at this site will consist of 8 launching lanes and 610 parking spaces. Launching lanes will be concrete and roads and parking will be asphalt surfacing. Drinking water and portable-type sanitary facilities will complete the development. Plate 9 shows the scheme of anticipated development.

Kelly Ridge

The Oroville visitor facilities complex will be located on Kelly Ridge 6 miles northeast of Oroville near the left abutment of Oroville Dam. This complex is not within the province of this plan. A separate report on the Oroville visitor facilities is presently under preparation.

Borrow Area

The borrow area, 5,645 acres, which was acquired for the materials to construct the dam and for recreation and fish and wildlife enhancement, will be retained in state ownership and developed for extensive recreation and fisheries and wildlife use involving a wide range of activities, with certain specific locations receiving intensive use. No additional lands in conjunction with the borrow area will be required for recreation purposes. A separate report on the Oroville borrow area is presently under preparation.

Feather River Hatchery

The visitors facilities located at the Feather River Hatchery will be described in a separate report on the Oroville visitor facilities which is presently being prepared.

Vegetative Retention Areas

The natural vegetative cover was retained in 18 coves at Oroville reservoir. This vegetative retention plan was the result of a study made by the Department of Fish and Game. The vegetation is expected to improve fish habitat and, therefore, improve the fishery. The locations of the coves are shown on Plate 1.

Future Recreation Development

As past experience has shown, predictions of future recreation use and development cost are difficult to make. Recreation activities have changed greatly within the past decade with activities such as boating, water skiing, and skin diving becoming increasingly popular. This has resulted in changes in recreation use and development that were not foreseen ten years ago. Therefore, recreation use, development, and cost data prepared on future facilities is based on today's types of recreation and does not include the effect of new types of recreational activities not presently known.

Table 3, "Oroville Complex, Proposed Decadal Recreation Development and Estimated Costs", indicates the proposed decadal development of facilities, and estimated cost required to satisfy the decadal increments in visitor use based on today's criteria, standards, and values.

Bidwell Canyon

Bidwell Canyon is not slated for development during the first decade, but this site will be available and used for future developments as the need and demand become evident. This location will provide for swimming, picnicking, boat-launching lanes and boating.

Craig

Craig is one of the large sites not slated for development during the first decade. It is 20 miles northeast of Oroville on the Feather Falls Road and

TABLE 3

OROVILLE COMPLEX
PROPOSED DECADAL RECREATION DEVELOPMENT AND ESTIMATED COST[1/]

	First Decade 1968-1977	Second Decade 1978-1987	Third Decade 1988-1997	Fourth Decade 1998-2007	Fifth Decade 2008-2018	Total Number of Units
Camp Units	719[2/]	420	515	610	685	2,948
Parking Stalls	675	420	515	610	685	2,905
Standard Picnic Unit	605	310	270	340	450	2,025
Parking Stalls	890	850	940	1,190	1,575	5,595
Portable Picnic Unit	-	185	270	340	450	1,245
Parking Stalls	-	280	405	510	675	1,870
Boat Launching Lane	24	18	17	21	27	107
Parking Stalls[3/]	1,110	895	845	1,055	1,357	5,262
Parking Stalls for Beach Areas	595	400	280	350	450	2.075
Total Decade Development Cost	$9,595,000	$8,804,000	$8,100,000	$10,123,000	$13,020,000	$49,642,000
Present Worth Recreation Cost						21,049,000
Specific Recreation Land Cost (including acquisition costs)						2,420,000
Recreation Access Road Cost (including present worth of future roads)						1,362,000
Present Worth of O&M						13,788,000
Present Worth of Replacement						12,830,000
Special Reservoir Clearing and Land Leveling						528,000
Total Present Worth of Recreation Development						$51,977,000
Average Annual Equivalent Cost						$ 2,419,500

1/Recreation development based on recreation use projections shown in Table 1.
2/Includes 44 "primitive camp units" without parking areas.
3/Parking stalls at boat launching ramps are large enough for a car and trailer in one stall.

will eventually provide for the bulk of overnight camping at the reservoir. It is expected that a relatively small amount of day use will develop, but that the predominant use will be camping, both family and group. Other activities will include swimming, boating, and fishing. The facilities are to be provided during the second decade of reservoir operation.

Potter Ravine

Potter Ravine is seven miles northeast of Oroville, immediately north of Oroville Dam. Recreation facilities are not expected to be developed at this site during the first decade. However, during the second decade, facilities will be constructed which will provide for overnight and day uses.

Bloomer

Bloomer is 16 miles north of Oroville, approximately 3 miles northwest of the Foreman Creek location, on the North Fork Feather River. The Bloomer site is not scheduled to be developed during the initial period; however, development is expected during the second decade, primarily for overnight use.

Sycamore Creek

Sycamore Creek is scheduled to be another boat-in, primitive style camping site. It will augment the primitive developments at Goat Ranch and Bloomer Primitive. This site is northeast of Oroville, on the north side of the Middle Fork Feather River, across the reservoir from the Craig location. No development is contemplated until the second decade of operation.

Foreman Creek

Foreman Creek is about 15 miles northeast of Oroville on the Oroville-Lake Madrone-Bucks Lake Road. This location is well suited for day use activities and has been so designated. Development of the Foreman Creek is planned for the second decade.

Thermalito Diversion Pool

Thermalito Diversion Dam is located on the Feather River about four miles downstream from Oroville Dam and about one-half mile upstream from Oroville. This structure diverts the water releases from Oroville Dam into the power canal and into Thermalito Forebay.

No recreation has been planned for this water body nor for the power canal. Because of the narrow, rocky, restricted nature of the Feather River's channel below the dam, the recreation potential is so limited that it is considered economically infeasible to provide recreation facilities.

Operation Plan

The Davis-Dolwig Act stipulates that the responsibility for operating "recreational areas" at state water projects resides in the Department of Parks and Recreation.

The Department of Fish and Game is responsible for managing the projects' fisheries and wildlife resources. Fishing will be allowed at the reservoir in accordance with state laws and regulations, but subject to modification by the requirements of public health and safety and the operation of the dams and reservoirs. To provide for the expected fishing demand at Oroville reservoir, it will be necessary for the Department of Fish and Game to develop and sustain a reservoir fishery. It is expected that warmwater and coldwater fisheries will develop after initial stocking, as at Folsom Lake and Shasta Lake, and that management techniques will result in periodic plants of desirable sport fish as well as forage species. Table 4 shows the number,

Table 4: OROVILLE COMPLEX - FISH AND WILDLIFE DEVELOPMENT AND OPERATING COST

Year	Species	Number	Cost
1967-68	Largemouth Adult Bass	1,100	$ 2,000
	Redear Adult Sunfish	10,000	1,000
	Kokanee Fingerlings	500,000	2,500
	Rainbow Trout Fingerlings	500,000	10,000
			$15,500
1968-69	Kokanee Fingerlings	1,000,000	$ 5,000
	Rainbow Trout Fingerlings	1,000,000	20,000
			$25,000
1969-70	Kokanee Fingerlings	1,000,000	5,000
	Total Initial Planting Cost		$45,500
1970-Continuing		$5,000 to	$50,000*

*Annual planting cost could vary greatly depending upon the ability of the Kokanee to reproduce naturally in Oroville reservoir.

species, and costs of initial fish plantings. An additional management technique has resulted in the application of a vegetative retention plan during the reservoir clearing phase, whereby the vegetation in 18 coves will be retained for fish habitat improvement. (See Plate 2.)

The Oroville complex is classified as a recreation area and hunting is a planned activity. Waterfowl concentrations in the Rice Bowl, adjacent to the Thermalito Afterbay, should provide good waterfowl hunting at the Afterbay in the borrow area, and possibly at the main reservoir. The hunting aspect must be approved by the State Park Commission after consideration of all the recreation needs. The Fish and Game Commission will recommend to the State Park Commission which areas should be opened to hunting and the seasons.

For the proper operation of a large recreation area such as the Oroville complex, a permanent crew will be required with additional seasonal help during the summer. A large variety of equipment will also be required, including land vehicles, patrol boats, and maintenance equipment. Year-round maintenance and repair will be necessary. Visitors will need to be checked in and out and their safety and welfare maintained. All of this will require coordination with reservoir operation.

The operation and maintenance costs are computed at $.30 per visitor-day, which is an average cost for state park and recreation units, including overhead. Replacement costs are calculated at 3.5 percent per annum of the capital costs. It will be desirable to offset as much of the maintenance and operation costs as possible by charging standard State Park System fees for use of recreation facilities.

Fire control is a primary function of the Division of Forestry, Department of Conservation. However, this does not relieve the operating agency from the responsibility of fire control as well as fire prevention. It will be the responsibility of the Division of Beaches and Parks and the Division of Forestry to mutually agree to a fire control and prevention program similar to the present coordinated program of the two organizations at other state park units.

The Department of Harbors and Watercraft is the agency responsible for the promulgation of rules and regulations governing boating on waters within the State. It is expected that the Division of Beaches and Parks and the County of Butte will be responsible for maintaining law and order on the water surface and in the recreation areas within their respective jurisdictions.

The Feather Falls Scenic Area as shown on Plate 1 is part of Plumas National Forest and will be managed by that agency.

The Department of Parks and Recreation, Division of Beaches and Parks, is presently doing the preliminary investigations on traffic problems, water supply and sanitary features of each recreation area. It is anticipated that some initial recreation areas will be connected to the existing water and sanitary facilities of the City of Oroville. Other more remote areas will probably use treated reservoir water and leach fields for sewage effluent. Soil tests have been made in all proposed recreation areas. As the design of each recreation area progresses, the development of entrance roads, water supply and sanitary features will be coordinated with all interested local and state agencies for their approval.

APPENDIX A

PERTINENT LETTERS AND CORRESPONDENCE

DEPARTMENT OF THE ARMY
Sacramento District, Corps of Engineers
650 Capitol Mall
Sacramento, California 95814

COPY

In Reply Refer To
SPKGP

16 November 1965

Mr. Carl A. Werner
District Engineer
Department of Water Resources
P. O. Box 388
Sacramento, California 95802

Dear Mr. Werner:

Your 25 October 1965 letter to the Division Engineer, South Pacific Division, transmitting copies of a draft of Department of Water Resources Bulletin No. 117-6, "Oroville Division Recreation Development Plan" has been referred to this office for review and direct reply. The contract between the State of California and the Department of the Army provides for Federal payment for flood control storage in Oroville Reservoir and operation for flood control in accordance with regulations prescribed by the Secretary of the Army. Federal payment is based on 22 percent of the actual cost of the project, exclusive of the power and recreation facilities. In view of the fact our participation in this project is limited to the flood control function, we have no comments to offer on the plans for recreational developments.

Your courtesy in keeping us informed of your investigations and providing opportunity to review and comment on your report is appreciated.

Sincerely yours,

/s/

ROBERT E. MATHE
Colonel, CE
District Engineer

UNITED STATES DEPARTMENT OF AGRICULTURE
Forest Service
California Region
630 Sansome Street
San Francisco, California 94111

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In Reply Refer To
2750 (7100)
FPC No. 2100

November 23, 1965

Mr. William E. Warne, Director
California Department of Water Resources
P. O. Box 388
Sacramento, California 95805

Dear Mr. Warne:

We have reviewed the draft copies of your Bulletin No. 117-6 which you sent to us on October 25, and to the Forest Supervisors of Plumas and Lassen National Forests. We appreciate the opportunity to submit our comments, which are as follows:

1. The Feather Falls Scenic Area is shown on Plates 1 and 2, but is apparently not mentioned in the text. It is not an integral part of the Oroville Reservoir project area, but is definitely contiguous to it, and could well be mentioned on page 32 of the text. We suggest identifying it as being a part of Plumas National Forest, and showing the National Forest boundary adjacent to the reservoir on Plates 1 and 2.

2. Boaters will undoubtedly tour up the Middle Fork Arm at high water stages to view the Feather Falls, and perhaps do limited hiking in that vicinity. This would create an immediate and basic need for a boat-beaching area or small float and foot-ramp, and sanitation facilities. Also, a foot trail thence up to an observation point below the Falls should be considered for inclusion in recreation plans. Lands lying within the project boundary of FPC Project 2100 on which the above suggested facilities would likely be located are:

   $E\frac{1}{2}$ Section 34, T. 21 N., R. 6 E., which is U. S. land within Plumas National Forest; and $W\frac{1}{2}$ $NW\frac{1}{4}$ of Section 35, T. 21 N., R. 6 E., which is privately-owned land,

as shown on Exhibit K-4-b, FPC 2100, and should be acquired by the State if it has not been (transfer of this parcel to the U. S. by land exchange could then be considered), in accordance with page 19, item 6.

We recommend that the State should build the sanitation and boat-beaching facilities, and the trail and observation point, if adopted in the recreational plan. Administration and maintenance of this small facility within Plumas National Forest should logically be by the U. S. Forest Service.

3. We suggest including in the recreational land-use plan (page 19) the concept of environmental control: preservation or enhancement of waterfront scenery and view areas.

4. The need for maintenance crew and equipment is mentioned at the top of page 30, and recreation development OM&R estimates are included on page 31. The planning and location of work center buildings for the use of such maintenance and operating crew should be integrated into the recreation development plan if this has not been done.

If you have further questions on item 2 (or any other related subject) we would be glad to discuss them at your convenience.

Sincerely yours,

CHAS. A. CONNAUGHTON
Regional Forester

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BUTTE COUNTY

Land of Natural Wealth and Beauty

Administrative Office
Courthouse, Oroville, California

December 1, 1965

Mr. Carl Werner, District Engineer
Department of Water Resources
P. O. Box 9137
Sacramento, California

Dear Mr. Werner:

This is in reply to your recent letters to me and to the Board of Supervisors in which you invited the county's reaction to the draft of Bulletin 117-6, Oroville Division Recreation Development Plan. Our Directors of Public Works, Planning and Health have reviewed the Bulletin. Our Supervisors considered it at their meeting November 23 and have authorized that this letter be written to state the County's position concerning the following points:

1. We are concerned about the impact of traffic on present access roads leading to the proposed recreational areas. As you know, these roads were never intended to handle the volume of traffic which will result because of the development of these recreational areas. We are not in a financial position to rebuild, widen and provide traffic control to the extent which we believe will be necessary. Mr. Castleberry and I want to discuss this with you in more detail at our meeting which we have arranged for December 8. Meanwhile, we believe there are a number of situations which should be set forth:

a. At the Loafer creek area, traffic channelization should be provided at the park entrance. Consideration should also be given to four lane construction on the Oroville-Quincy and Olive highway roads for the ultimate volume of traffic at Loafer creek and the other recreation areas to the north.

b. For the proposed Lime Saddle area, portions of the Pentz-Magalia and Nelson Bar roads are not adequate in roadway work or structural composition for the traffic which will come.

These roads should be rebuilt from the end of the Bennum road relocation to the Nelson Bar road and extending to the recreation entrance. Turning lanes should be provided at the entrances.

c. For the Thermalito forebay north area, considerable traffic will probably use Nelson avenue between 99E and 70 to reach this area. Nelson avenue needs realignment and structural improvement to carry this additional traffic. The proposal shows a road extending from the recreation area to Nelson avenue. The connection of this road to Nelson avenue will require further study.

d. For the Thermalito forebay south area, the gravel portion of Tres Vias road west of 20th street (extension of Grand avenue) is not adequate for recreation traffic and should be rebuilt, especially since it will also serve the power plant and heavy equipment yard to be built by your Department.

e. For the Foreman creek area, the Oroville-Quincy road is not adequate or safe for access for the initial recreation development. This road should be rebuilt and traffic channelization from the end of the present C-6 relocation to the recreation area.

f. For the Gold Dredge flats area, channelization and left turn lanes are needed at the entrance from the relocated Oroville-Willows road.

g. For the Craig recreation area, the section of the Lumpkin road from this area to the relocated Feather Falls road will require improvement. Although the Kelly Ridge visitors area is excluded from your bulletin, there are also access problems to this facility.

2. The County believes the P.G. & E. dam near the Western Canal should be improved and maintained in order to maintain a certain water level in the Feather River fronting the City of Oroville and to permit the continued use of this portion of the river for recreational activities.

3. Our County Health Department should have the opportunity to review detailed plans of each area with respect to water supply, bathing areas, food concessions, sewage disposal and garbage and trash disposal. We are concerned about the problem of sewage discharge from boats. It is desirable that such discharges be regulated and that dock-side facilities be provided to accept sewage discharges from boat holding tanks.

4. Plate five, which shows the Lime Saddle developed area plan, shows one area to be designated as the "Magalia area". We believe this name would be misleading to the general public because the Magalia area is a community about twelve miles north of the Lime Saddle area. We suggest that a name be substituted which would be more closely related to the nearby area.

5. The County believes that your plan should emphasize private enterprise in the development of related concession features and that this should consist of operation by small enterprises rather than operation by a single large concessionaire.

6. The County believes there should be public access to the lake by private property which borders State-owned property and that the boundary line not be fenced.

The County wishes to congratulate you and the Department for the thought and imagination which has gone into the development of this plan. We cannot help but be thrilled at the recreational future which this plan contemplates for the people of California. Our only concern is that we in Butte County are not overburdened with financial problems as a result of this development which is planned to serve visitors from all over the State.

Very truly yours,

/s/

George Gaekle
Administrative Officer

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Phone (916) 877-2326
P. O. Box 251

PARADISE CHAMBER OF COMMERCE

Paradise, Butte County, California - Where You'd Like to Live

November 10-1965

Mr. Carl A. Werner
District Engineer
Department of Water Resources
P. O. Box 388
Sacramento, California

Dear Mr. Werner:

Thank you for your Bulletin No. 117-6 "Oroville Division Recreation Development Plan". This is of great interest to us all.

It seems to us to be a very fine plan. The only suggestion we would offer would be that some other name be given the "Magalia Area" (Plan 5), since Magalia is a fairly well known community some 18 miles north of the Lime Saddle Area and the present name could be confusing.

If possible, we would very much appreciate receiving another copy of your Bulletin No. 117-6 "Oroville Division Recreation Development Plan", and thank you in advance for your attention to this.

Sincerely

/s/

Mrs. F. D. Baldinger
Secretary-Manager

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Harvey Roth, Director
6626 Skyway - Phone 877-6211
Paradise, California 95969

PARADISE RECREATION AND PARK DISTRICT

November 16, 1965

Mr. Carl A. Werner
District Engineer
Department of Water Resources
P. O. Box 388
Sacramento, California

Dear Mr. Werner:

The Paradise Recreation and Park District Board of Trustees reviewed the Recreation Development Plan #117-6. This plan meets with the support of the Board, and the only recommendation made is that the name shown on plate 5, "Magalia Area", be changed to a name more consistent with the area. The name Magalia Area also identifies the community of Magalia, which is approximately 13 miles north of the Lime Saddle Park.

With a complex like this, names are very important for identification. If the name of an area is similar to the name of another area, confusion on the part of the general public may well result.

The Board of Trustees made no offer of an alternate name for this site. May I suggest Parish Area or Paradise Area. Changing the name from Magalia Area to another name may sound insignificant in the relationship of the vast effort being put out, but it is one that the Board picked up immediately and they feel confusion may occur with the Magalia Area name.

Sincerely,

/s/

Harvey Roth
District Director

HR:lg

State of California
MEMORANDUM

The Resources Agency

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TO: Honorable William E. Warne, Director
Department of Water Resources
1416 Ninth Street
Room 1123-15
Sacramento, California

DATE: December 10, 1965

FROM: Department of Fish and Game

SUBJECT: WP - State of California, Feather River Project, Review of Draft Report: Bulletin No. 117-6, "Oroville Division Recreation Development Plan"

Bulletin No. 117-6, Oroville Division Recreation Development Plan has been reviewed and we have the following comments:

> The recreation use predictions for Oroville Reservoir are in part predicated on angling use. To support this use, a population of game fish would have to be available in the reservoir in addition to onshore facilities. Without at least an initial stocking of game and forage fishes and quite possibly a continuing stocking, it is very unlikely the recreation use predictions will become a reality.

Therefore, we propose that the subject report include a General Fund appropriation recommendation for fish stocking in Oroville Reservoir as follows:

Fiscal Year 1967-68

March to May 1968, assuming there is a sizeable reservoir present by this time.

Species	Size	Number	Cost Per Fish	Total Cost
Largemouth Bass	Adults	1,000	$2.00	$ 2,000
Redear Sunfish	Adults	10,000	0.10	1,000
Kokanee	Fingerling	500,000	0.005	2,500
Rainbow Trout	Fingerling	500,000	0.02	10,000
			Total for Fiscal Year 1967-68	$15,500

Fiscal Year 1968-69

March to May 1969

Species	Size	Number	Cost Per Fish	Total Cost
Kokanee	Fingerling	1,000,000	$0.005	$ 5,000
Rainbow Trout	Fingerling	1,000,000	0.02	20,000
			Total for Fiscal Year 1968-69	$25,000

It is assumed that by the spring of 1969 the reservoir will be considerably larger and there will be a reduction in survival of the trout and kokanee fingerlings due to established predator fishes.

Fiscal Year 1969-70

March to May 1970

Species	Size	Number	Cost Per Fish	Total Cost
Kokanee	Fingerling	1,000,000	$0.005	$5.000
			Total for Fiscal Year 1969-70	$5,000

If the kokanee are not successful in reproducing naturally in Oroville Reservoir, then a continuing stocking program of 1,000,000 fingerlings would be necessary. Also a continuing program of planting approximately 150,000 yearling or older rainbow and/or brown trout may be necessary to maintain the fishing intensity predicted in the Oroville Recreation Development Plan report. This stocking will depend on the success of developing a successful kokanee fishery. If a continual trout stocking program becomes necessary, it will be an annual cost of $50,000 by stocking 150,000 trout weighing three per pound and costing $0.33 each.

Thus, fish management budgets for planting of fish in Oroville Reservoir from fiscal year 1970-71 on would be as follows:

1. Either $5,000 annually for the maintenance of a kokanee fishery; or

2. No cost because the kokanee are able to maintain their own numbers through natural reproduction; or

3. $50,000 annually if the kokanee fishery fails or is found to be of less value than a program of planting yearling or older trout. Threadfin shad, a forage fish, would have to be present in the reservoir for the trout

program to be successful. The introduction of shad in Oroville Reservoir would preclude the development of a kokanee fishery.

Other suggested changes or additions to the report are as follows:

Page 21 - Recreation Evaluation of Reservoir - We recommend that an additional assumption for projections of recreation use be added as follows:

4. A fishery will be developed in Oroville Reservoir to support the predicted angler use.

Page 29, paragraph 2 - Add "See Plate 2 for location of retention areas".

Page 29, paragraph 3 - It is pointed out that the State Park Commission will make the final determination if hunting is to be part of the recreation use of (1) Thermalito Afterbay, (2) the Borrow Area, and (3) the main reservoir.

Waterfowl hunting is a "must" on areas "A" and "D" of the Borrow Area since the entire concept and future plan for these areas is predicated on their being developed into permanent marsh management areas.

Thermalito Afterbay, with its fluctuating water levels and proximity to Sacramento Valley agricultural croplands, is a natural for scull boat waterfowl hunting as well as boat blind decoy shooting. The lack of other recreational use on Thermalito Afterbay during the waterfowl season, and therefore the lack of conflict of recreational uses, spotlights the importance of utilizing the potential waterfowl hunting recreation at Thermalito Afterbay.

Although the main Oroville Reservoir will have a multitude of recreational uses, we suspect that there would be little conflict between winter waterfowl shooting and other Oroville Reservoir winter recreation.

Plate 2 - Add vegetation retention areas as shown in the Oroville Reservoir clearing specifications No. 65-05.

/s/ W. T. Shannon

Director

State of California
MEMORANDUM

The Resources Agency of California

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TO: Department of Water Resources
1416-9th Street
Sacramento, California

Attention: Mr. Carl Werner

DATE: December 14, 1965

SUBJECT: WATERSHED MANAGEMENT Oroville Division Recreation Development Plan Oroville Reservoir Butte Unit District 1

FROM: Department of Conservation-Office of the Director

Reference is made to your letter of October 25, 1965, relative to this Department's review and comments on Bulletin 117-6, "Oroville Division Recreation Development Plan".

Our comments are listed below.

The need for fire protection in and adjacent to recreational areas should be considered an essential element of recreation plans. The Division of Forestry is cooperating with the Division of Beaches and Parks in the development of fire protection needs to off-set the added risk of fires starting by recreationists who will be using the recreational facilities at the Oroville Reservoir Project.

As soon as firm plans are developed and approved, we will advise.

/s/

DEWITT NELSON
Director

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cc-District 1

State of California
MEMORANDUM

Department of Public Health

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TO: Department of Water Resources
Post Office Box 388
Sacramento, California

Attention: Carl A. Werner
District Engineer
Sacramento District

DATE: November 12, 1965

SUBJECT: Review of Draft of "Oroville Division Recreation Development Plan"

FROM: Bureau of Sanitary Engineering
2151 Berkeley Way
Berkeley, California

At your request, we reviewed your Bulletin No. 117-6, "Oroville Division Recreation Development Plan". The report includes a description of the proposed recreational area developments for Oroville Reservoir and other parts of the State Water Project in the area.

As construction plans for the recreational facilities are prepared, we and the Butte County Health Department would like to reivew the design for sanitation facilities, including water supply and sewage treatment and disposal facilities. We will be glad to help on questions on public health problems relating to the recreational facilities design and operation.

/s/

H. B. Foster, Jr., Chief
Bureau of Sanitary Engineering

HBF
GBG:eo

cc: BSE - Sacramento
District

State of California
MEMORANDUM

Highway Transportation Agency

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TO: Department of Water Resources
1416 Ninth Street
Sacramento, California

Attention Mr. Carl A. Werner

DATE: November 8, 1965

FILE: 03-But-70,162
Oroville Dam
Recreation
Development Plan

FROM: Department of Public Works-Division of Highways

SUBJECT: Bulletin No. 117-6

Reference is made to your letter of October 25, 1965, requesting comments on Bulletin No. 117-6, "Oroville Division Recreation Development Plan", dated October 1965.

Construction of the Lime Saddle Recreation Area will, undoubtedly, generate considerable traffic on Route 70 between Oroville and Pentz-Cherokee Road; however, the existing highway is adequate to handle this traffic. In connection with this, we understand that the agreement between Butte County and Water Resources is to improve certain county roads in lieu of reconstructing the Nelson Bar Road across the reservoir. This agreement provides for a channelized intersection to be constructed at the intersection of Route 70 and the Pentz-Cherokee Road at Water Resources' expense.

Construction of the Thermalito Afterbay Recreation Area will, undoubtedly, increase traffic on Route 162 between Route 99 and Route 70 at Oroville. Route 162 is deficient in width at this time and increased traffic use will aggravate this condition.

The Thermalito Forebay Recreation Area will be serviced by the recently completed 4-lane freeway on Route 70. An interchange was provided with this service in mind and no further highway development will be required.

Future development of the Borrow Area may increase traffic on Highway 70 south of Oroville to some extent but the anticipated use of this area seems to be rather small.

The other recreation areas planned will not directly affect State highway routes, except by general over-all increase in traffic over the years.

/s/
J. C. WOMACK
State Highway Engineer